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# Electric Railway Journal

## Volume 50

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# Instructions for Use of Index

This index is essentially a subject index, not an index of titles, and articles treating a number of different subjects are indexed under each of them. In addition, a geographical reference is published wherever the article relates to any particular railway company, or to the State matters of any particular State. The geographical method of grouping serves to locate in the index any article descriptive of practices, conditions, events, etc., when the searcher knows the electric railway, city or State to which the article applies. Groupings are made under the name of the city in which the main office of the company is located, but an exception is made in the case of electrified sections of steam railroads, such entries being made direct under the name of the railroad. City or State affairs appear direct under the names of the city or State involved.

In the subject index, the alphabetical method is followed, and if there is a choice of two or three keywords the one most generally used has been selected, cross references being supplied. Below will be found a list of the more common keywords used in the index. This list has been subdivided for convenience into sixteen general subjects, but the general subject headings, shown in capital letters, do not appear in the body of the index. As an example, if a reader wished to locate an article on power-driven tower wagons he would obviously look in the list under the general subject "vehicles," and of the two keywords that appear under this caption, only "Service and tower wagons" could apply to the article in question. The reader would therefore refer to this keyword under "S" in the body of the index. Articles not covered by keyword appear alphabetically.

In addition to the groups of articles covered by these headings the papers and reports from railway associations and technical societies are grouped under the names of the various organizations. Proceedings of other associations are indexed only in accordance with the subject discussed. Short descriptions of machine tools appear only under the heading "Repair Shop Equipment" and are not indexed alphabetically, because of the wide choice in most cases of the proper keyword.

## CLASSIFIED LIST OF KEYWORDS

### ACCIDENTS AND LEGAL

Accidents (including wrecks)
Accident claim department
Legislation
Legal
Public service and regulative commissions
Public service corporations
Safety-first movement

### CARS

Car design
Cars (descriptive)
Cleaning and washing of cars
Gasoline cars
Lubrication
Heating of cars
Lighting of cars
Storage battery cars
Ventilation of cars
Work and wrecking cars

### CAR EQUIPMENT

Axles
Bearings
Brakes
Controllers and wiring
Couplers and bumpers
Current-collecting devices
Doors, seats and windows
Fenders and wheel guards
Gears and pinions
Headlights
Motors
Trucks, car
Wheels

### EMPLOYEES

Employees
Insurance
Strikes and arbitrations
Wages

### FARES

Fare collection (including apparatus)
Fares
Tickets
Transfers

### FINANCIAL AND STATISTICS

Accounting
Appraisal of railway property
Financial
Franchises
Maps
Operating records and costs
Statistics
Traffic investigations

### HEAVY ELECTRIC TRACTION

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High-voltage d.c. railways
Interurban railways (general)
Locomotives
Low-voltage d.c. railways
Single-phase railways

### MAINTENANCE OF EQUIPMENT

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Inspection of cars
Maintenance records and costs
Paints and painting
Repair shop equipment
Repair shop practice
Repair shops
Tests of equipment
Welding, special methods

### OPERATION

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Operating records and costs
Passenger handling records
Schedules and time tables
Signals
Stopping of cars
Train operating practice

### POWER

Boilers and equipment
Cables
Energy consumption
Feeders
Overhead contact system
Poles
Power distribution
Power generation
Power stations and equipment
Purchased power
Substations and equipment
Third-rail contact system
Transmission lines
Turbo-generators and equipment

### RECORDS

Maintenance records and costs
Operating records and costs
Passenger handling records
Record forms

### STRUCTURES

Bridges
Carhouses and storage yards
Power stations and equipment
Repair shops
Terminal stations and terminals
Waiting stations

### TRACK

Pavement
Rail joints and bonds
Rails
Special work
Ties
Track construction
Track maintenance

### TRAFFIC

Freight and express
Public, Relations with
Publicity
Routing of cars
Traffic investigations
Traffic stimulation

### VEHICLES (not on tracks)

Motor buses
Service and tower wagons

### MISCELLANEOUS

Fire protection and insurance
Lightning protection
Loading limits for cars
Manufacturing conditions
Municipal ownership
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Progress in Freight Traffic Development

# ELECTRIC RAILWAY JOURNAL

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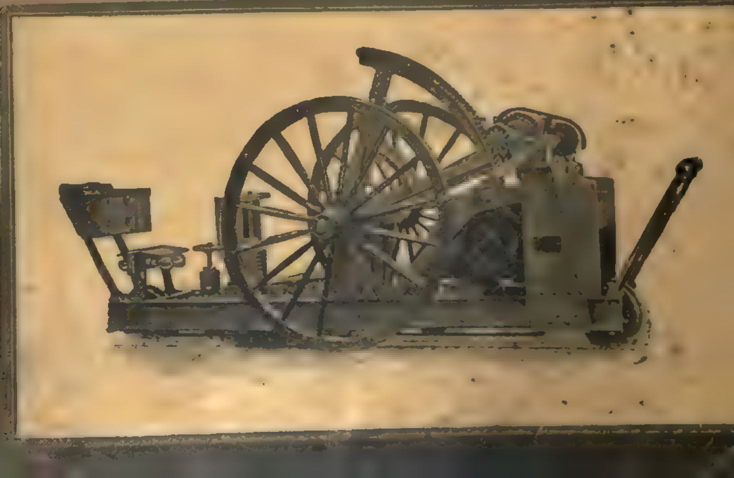

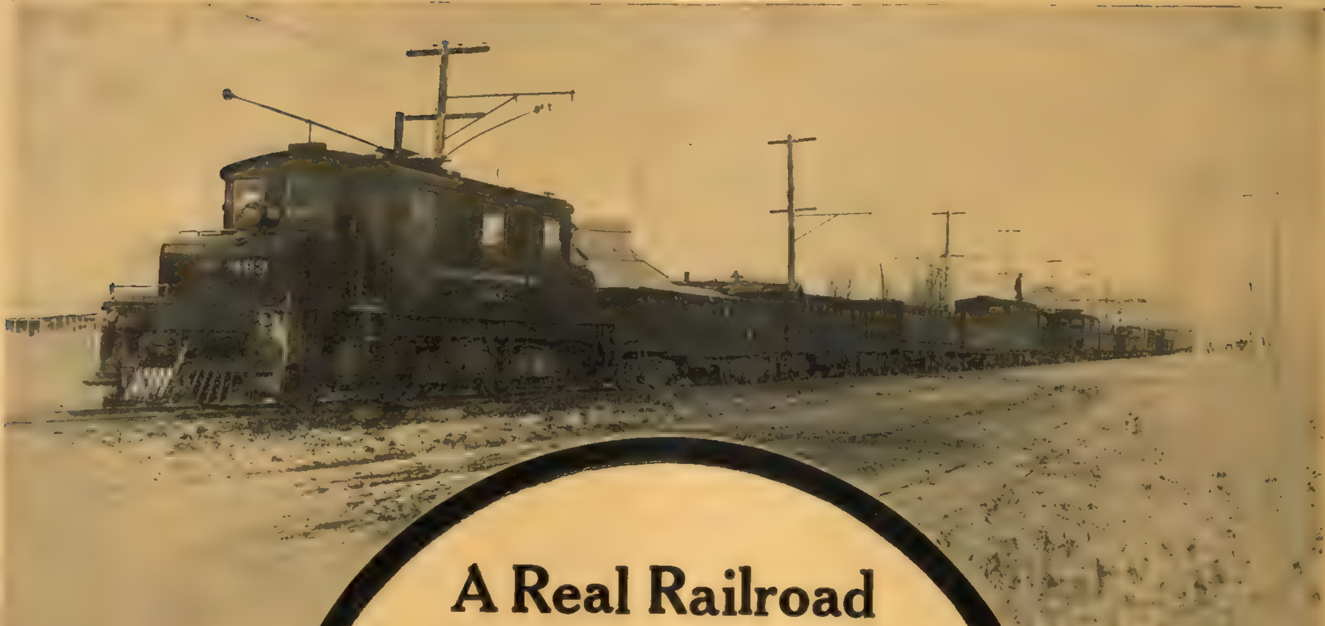

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The aggressiveness of the Toledo & Western Railroad has made it the pride of the territory which it serves. This is evidenced by their business boosting, and is further proven by their most recent addition of a 60-ton

**Baldwin-Westinghouse Locomotive**

equipped with HL Control and quadruple No. 308-D5 Motors for 600 volts.

*Address either company*

**The Baldwin Locomotive Works**
Philadelphia, Pa.

**Westinghouse Electric & Mfg. Co.**
East Pittsburgh, Pa.

# ELECTRIC RAILWAY JOURNAL

H. W. BLAKE, Editor

VOLUME 50, No. 1 NEW YORK, JULY 7, 1917 PAGES 1 TO 44

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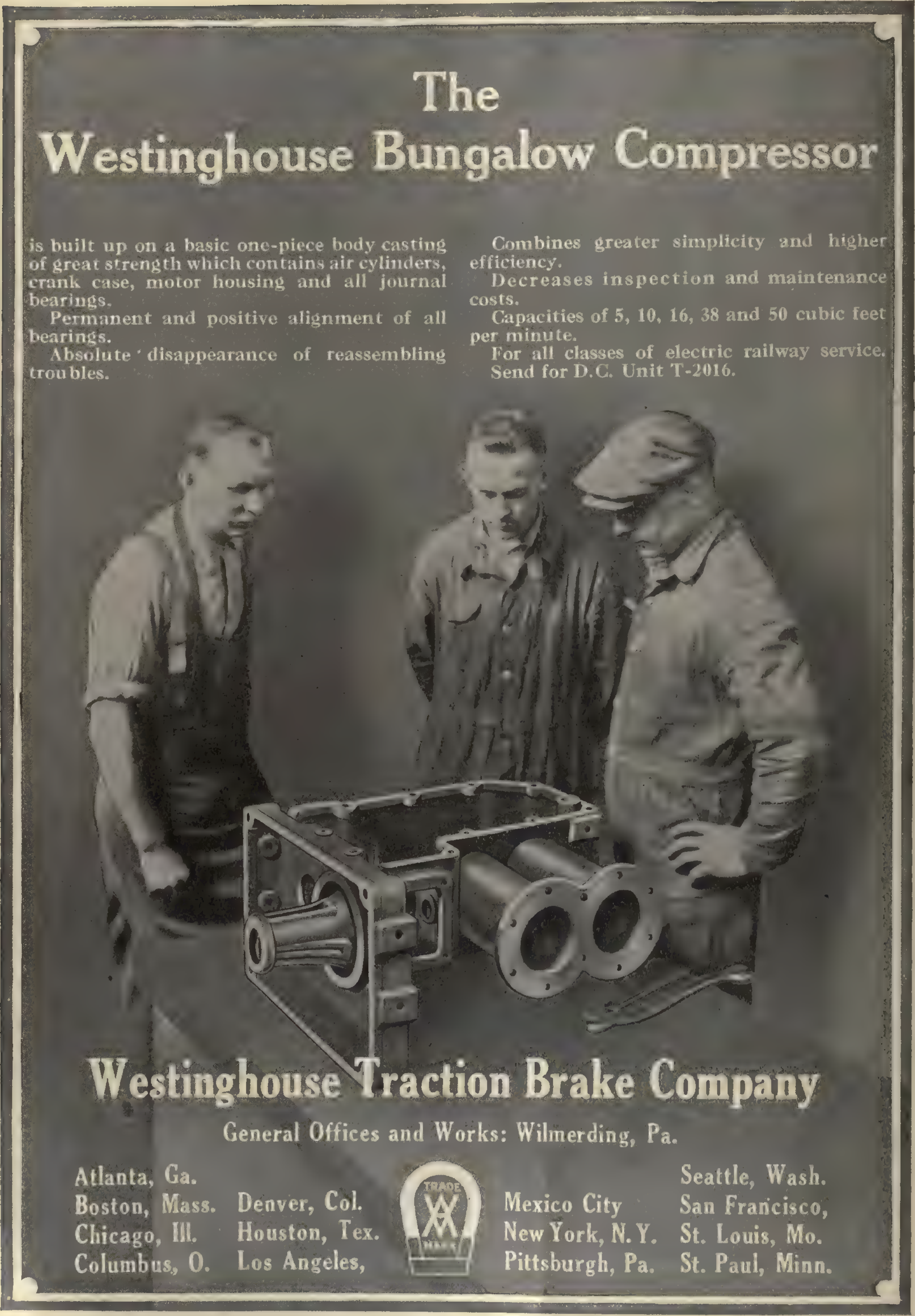

# The Westinghouse Bungalow Compressor

is built up on a basic one-piece body casting of great strength which contains air cylinders, crank case, motor housing and all journal bearings.

Permanent and positive alignment of all bearings.

Absolute disappearance of reassembling troubles.

Combines greater simplicity and higher efficiency.

Decreases inspection and maintenance costs.

Capacities of 5, 10, 16, 38 and 50 cubic feet per minute.

For all classes of electric railway service. Send for D.C. Unit T-2016.

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# The Safety Car Is Now Recognized as the Most Marked Innovation in Street Railway Operation in Recent Years

Safety Car Brake and Control Equipment
Just Installed on Cars at Shreveport
on Lines of Shreveport Railways Co.

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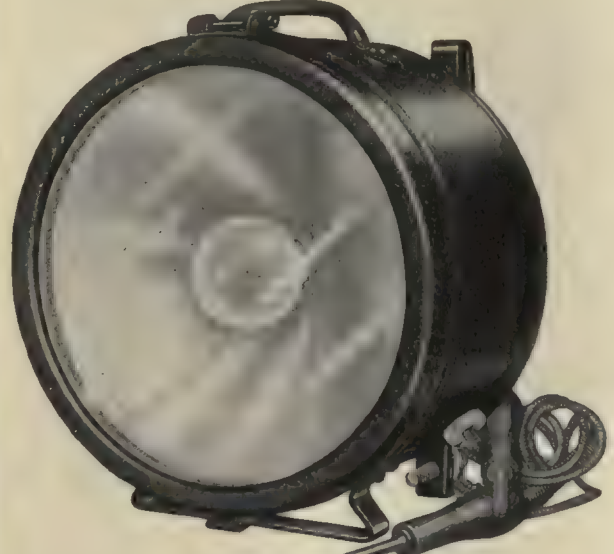
# For Maximum Illumination

## From the Incandescent Lamp



Type SDP
Imperial Incandescent Headlight
for Interurban Service

Incandescent Headlights are recommended for high speed service only when the voltage is well regulated because of the rapid decrease in efficiency of the lamp when the voltage drops.

Imperial Luminous Arc and Carbon Arc Headlights are practically unaffected by fluctuations in voltage.

Have you seen new catalog 201-202?

Crouse-Hinds Imperial Incandescent Headlights with Crystal Glass mirror reflectors send a clear, intense shaft of light (Crystal Ray) far down the track. Their coefficient of reflection is high and they utilize to the utmost all the power of the lamp.

Crystal Ray Reflectors are true parabolas accurately ground and polished on both sides, with a permanent silvering on the back. They retain all of their reflecting ability after long, hard service.

Another aid to efficient illumination is the simple focusing mechanism in Imperial Incandescent Headlights. It makes it easy to locate the lamp so the reflector can concentrate the light to the best advantage.

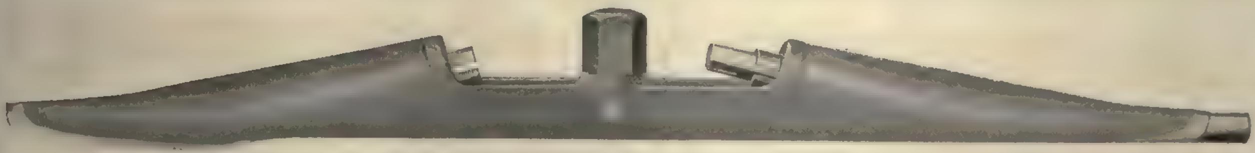
When it is desired Imperial Incandescent Headlights may be furnished for

Gold Ray (yellow light) produced either by a gold glass reflector or by Noglare glass in the door.

Sterling Ray (white light) produced by polished metal reflector.

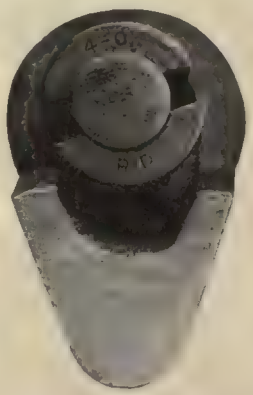
But for maximum illumination from a given lamp—Crystal Ray.

**The Ohio Brass Co.**
Mansfield, Ohio



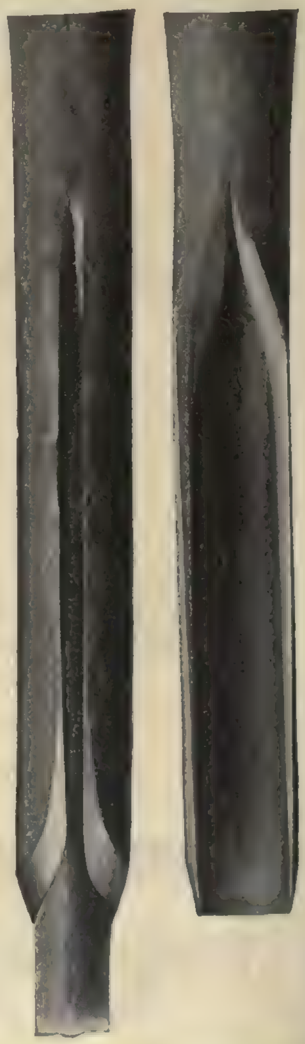
O-B Cleveland Splicing Ear (Patented), 21 inches long
(Also made 30 inches long)

# Plenty of Service from This Splicer



Compare the cross-section of an O-B Cleveland Splicer to the section of trolley wire. The cross-sectional area of the bronze is a little over three times as great as that of the copper. Even after the hardest wear there is still plenty of metal left to take the strain. It is a splicer which you may install and forget.

Tough as they are, the lips are ductile. Notice how smoothly they fit around the wire.



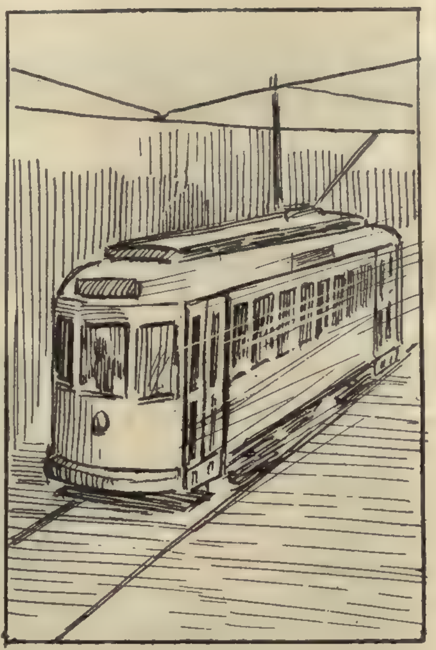
## O-B Cleveland Splicers

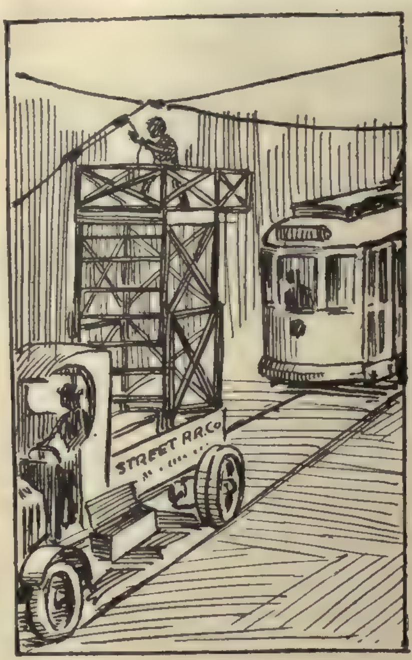
have the "Lily" approach. When the lips are hammered around the wire they make a smooth, gradual arc-reducing approach for the wheel. The illustration shows the peculiar design (patented) of the lips.

A still better way to find out is to send a trial order. You undoubtedly will see the advantage of the O-B Cleveland Splicer at once. Then when it goes up on the wire your judgment will be justified.

There are other O-B Splicers. Each is for a certain definite set of conditions. Pages 176-184, catalog No. 16.

**The Ohio Brass Co.**
Mansfield, Ohio





*Save 40% on wire cost and maintenance and eliminate trips of the emergency trucks*

**Aristos "COPPERWELD"**
**Copper Clad TROLLEY Wire**

combines the conductivity of copper with the strength of steel.

Copperweld wears uniformly and stays up twice as long as ordinary copper.

Fewer breakdowns mean better adherence to schedules. Let us tell you how.

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**Steel Sales Corporation**
**Chicago, Illinois**

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**Made from the product of COPPER CLAD STEEL CO., Pittsburgh, Pa.**
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Boston & Albany R. R.
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New York, Ontario & Western Ry.
Lake Erie & Western R. R.
Union Traction Company of Indiana
Tri-City Railway
New York Central & Hudson River R. R.
Chicago, Rock Island & Pacific Ry.
C. & E. I. R. R.
Central New England Ry.
Louisville Ry.
Mason City & Clear Lake R. R.
Minneapolis & St. Louis R. R.
Decatur Ry. & Lt. Co.
Wabash R. R.
Denver Tramways
Lewiston, Augusta & Waterville St. Ry.
Maine Central R. R.
Reading Transit & Light Co.
Philadelphia & Reading Ry.
Chicago Great Western R. R.
Missouri Pacific Ry.
Illinois Traction System
Kentucky Traction & Terminal
Queen & Crescent Route
B. & O. S. W. R. R.
Cincinnati Traction
Stark Electric Ry.
Pennsylvania Lines West of Pittsburgh
Wheeling & Lake Erie R. R.
Northern Ohio Traction & Light Co.
Southern Pacific
Terre Haute, Indianapolis & Eastern Traction

If your company's name is not in the list it should be. These companies are protecting their crossing frog investments.

*Let us show you why, and how moderate the cost.*

**Prompt deliveries made from stock.**

The International Steel Tie Company

Manufacturer of Steel Twin Ties and Crossing Foundations

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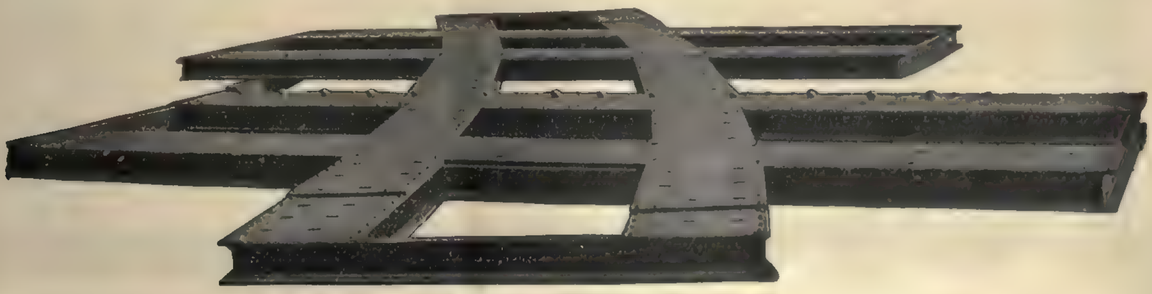
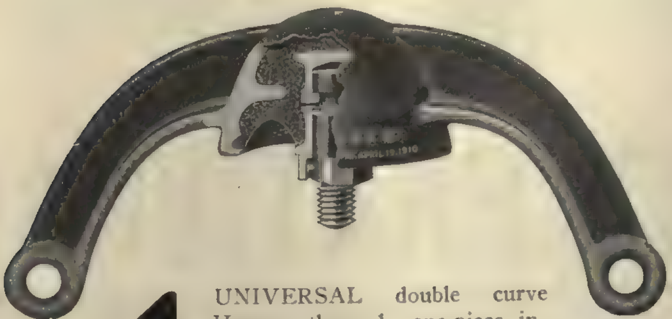
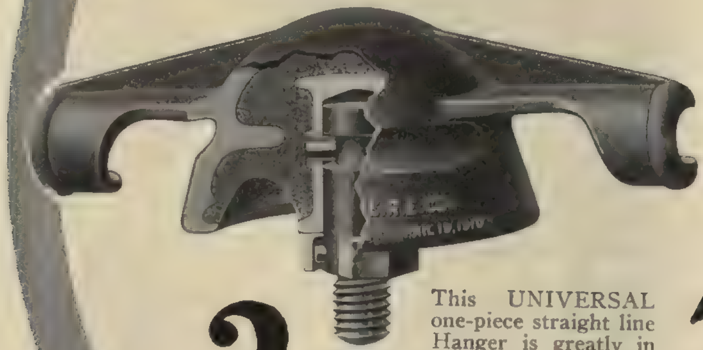




1

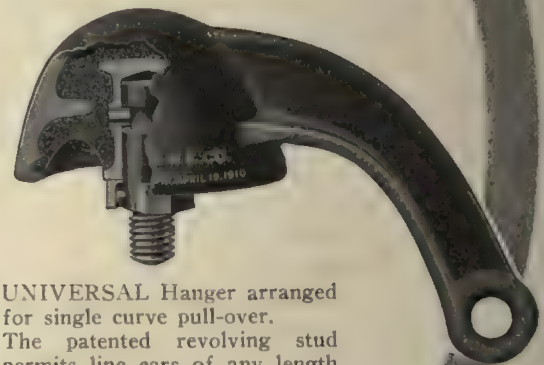
UNIVERSAL double curve Hanger, the only one-piece insulated pull-over now on the market. A great improvement over malleable iron yoke and separate insulators.



2

This UNIVERSAL one-piece straight line Hanger is greatly in advance of the old solid stud three-piece Hangers.

The revolving stud permits loss of ear to be drawn up tight against the Hanger face, relieving the threads from strain and insuring correct alignment of ear.



3

UNIVERSAL Hanger arranged for single curve pull-over.

The patented revolving stud permits line ears of any length to be attached to Hanger without the necessity of having removable arm as is required in similar Hangers with solid studs.

# CONSIDER

the Three UNIVERSAL Hangers shown on this page. They are worthy of your best attention.

They are one-piece Hangers, so that the disadvantages of the old three-piece Hangers are done away with.

Each Hanger has the revolving stud as an integral part of its construction. In your next order for trolley line material you'll specify these Hangers, especially if heavy suspension work on curves is to be undertaken.

Write now for further particulars.

**Electric Railway Equipment Co.**
**Cincinnati, Ohio**
**New York: 30 Church St.**

# "That's what I Call a Finished Job"

**Finished** because with **"Protected" Rail Bonds** the soft copper strands and terminals make fitting and compression a simple job to do neatly.

**Finished** because the "Shot-Over" Sleeves permanently protect the strands from the effects of vibration at the point where they emerge from the terminal.

Rebonding is expensive—use "Protected" bonds in the first place—just as they are doing here.

**ELECTRIC SERVICE SUPPLIES CO.**
***Manufacturer of Railway Material and Electrical Supplies***

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Canadian Distributors: Lyman Tube & Supply Co., Ltd., Montreal, Toronto

# These Roads Are Reducing Flange Wear on Old Cars by Installing

# Perry-Hartman Bearings

These bearings practically double the life of wheels, cut in half pull-ins for wheel renewals, decrease nosing, lessen flange and rail wear, reduce power consumption on curves, eliminate lubrication costs. The following roads are using them on both old and new cars and repeat orders testify as to service. Over 200,000 are in daily service. These railways know the results—

Aurora, Elgin & Chicago R.R.
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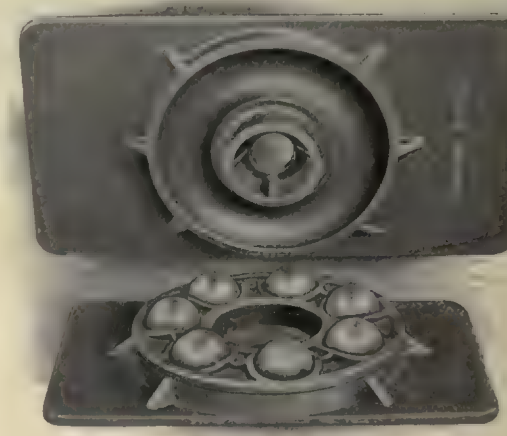
Calgary Railway
Carolina Power & Light Company
Cedar Rapids & Marion City Ry. Co.
Chambersburg, Greencastle & Waynesboro Street Ry. Co.
Chicago Elevated Railways
Chicago, South Bend & Northern Indiana Ry. Co.
Chicago & West Towns Railway Company
Cleveland & Eastern Traction Company
Cleveland & Erie Railway Company
Cleveland, Painesville & Eastern R.R. Co.
Colorado Springs & Interurban Railway Company
Denver Tramways Company
Des Moines City Railway Company
East St. Louis & Suburban Railway Company
Evanston Railway Company
Evansville Railways Company
Evansville Public Utilities Company
Fonda, Johnstown & Gloversville R.R.
Ft. Wayne & Northern Indiana Traction Co.
Ft. Wayne & Northwestern Railway Company
Gary & Interurban R. R. Company
Harrisburg Railways Company
Houghton County Traction Company
Lake Shore Electric Railway Company
Lehigh Valley Transit Company
Louisville Railway Company
Lowell & Fitchburg Street Railway Company
Mahoning & Shenango Railway & Light Co.
Maryland Electric Railways Company
Mason City & Clear Lake R. R. Company
Michigan Railway Company
Newport News & Hampton Ry., Gas & Elec. Co.
New York, Westchester & Boston Ry. Company
Northern Texas Traction Company
Oakland, Antioch & Eastern Railway
Ogden, Logan & Idaho Railway Company
Oklahoma Railway Company
Philadelphia Rapid Transit Company
Salt Lake & Utah R. R. Company
Schenectady Railway Company
Scranton Railway Company
Southern Traction Company
Union Traction Company of Indiana
Waterloo, Cedar Falls & Northern Ry. Co.
York Railways Company



Don't wait for new cars to show you Perry-Hartman bearing economies—they fit almost any old truck. Send for catalogue and dimension data sheet.

**Put Them On Your Old Cars**

# Holden & White Inc.

**Electric Railway Distributors for the Joliet Railway Supply Company**

**1508 Fisher Building, Chicago**

National Railway Appliance Co., New York and Washington; Grayson Railway Supply Company, St. Louis; C. E. A. Carr Co., Toronto; W. M. McClintock, St. Paul; Alfred Connor, Denver; O. H. Davidson Equipment Co., Salt Lake City; F. F. Bodler, San Francisco; S. I. Wailes, Los Angeles; W. F. McKenney, Portland, Ore.

# "IMPERIAL" PNEUMATIC TAMPERS AT DENVER

## *The Report States:*

"The labor cost is only 1/3 that of hand tamping. As yet the company (Denver Tramway Co.) hasn't gone into relative costs when the overhead investment is taken into consideration. However, the labor cost is $10.00 per day for the machines: for the same amount of tamping by hand it would be $30.00, so the overhead will not begin to balance it."

"Imperial" Tamping means more and better work with less labor and at less cost.

*Ask for a copy of*
*Bulletin 9023*

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**COMPANY**

11 Broadway, New York
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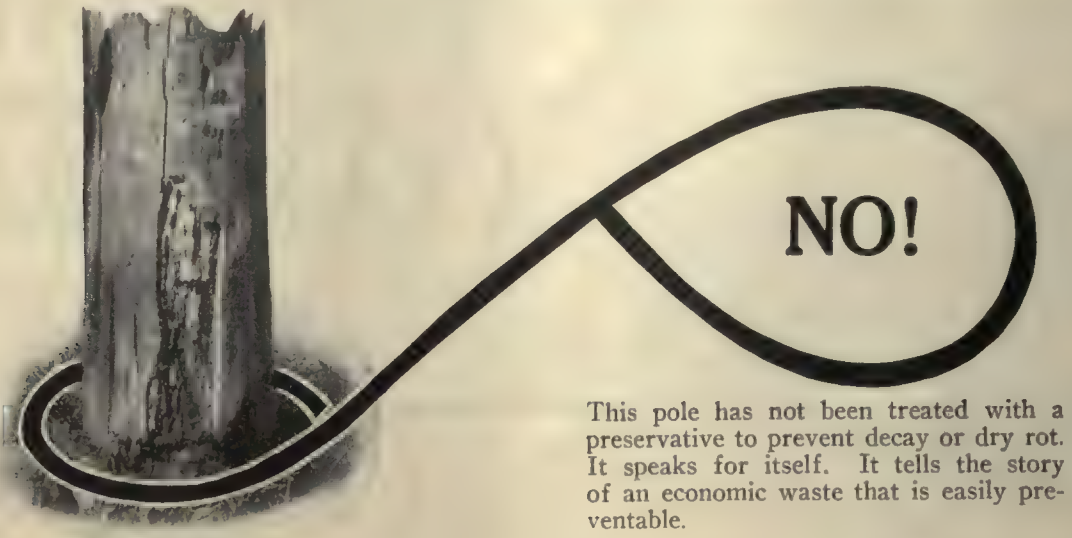
*Offices the world over*

62-TT



This pole has not been treated with a preservative to prevent decay or dry rot. It speaks for itself. It tells the story of an economic waste that is easily preventable.

This pole has been treated with a Wood Preservative. It has been in service longer and under more severe service conditions than the pole shown above. It tells the tale of long service, no replacement, no labor or maintenance expense.

**The Spot Test**

You can easily detect impurities in a coal-tar preservative by placing a few drops on clean white blotting paper. The impurities gather in a spot in the center and in a short time their presence is clearly defined in a distinct zone. Try this test: Remember that these impurities are of no value, that they are a hindrance to the action of the preservative, that they represent a high percentage of cost from which you get no return. Try this test on the Reilly Preservative.

**REILLY**

**Improved Wood Preservative**

**for open tank and brush treatment**

This preservative enters into the very fibers of the wood and there it stays. The purity of the Reilly Improved Wood Preservative insures its effectiveness, stability and permanence. This preservative makes positive the long service life of Poles, Cross Arms, Ties and Structural Timbers.
We can furnish this specially treated standard timber or any treated special material on short notice. Reilly Improved Wood Preservative can be supplied in any quantity from a gallon to a carload.
Let us know your problem. We can supply valuable information to help you in its solution.

*"It Stays in the Wood"*

**REPUBLIC CREOSOTING CO.**

**Indianapolis, Ind.**

**Plants:** Indianapolis Mobile Minneapolis Seattle

Phono-Electric

—the Trolley Wire of Long Life

Now a New Haven Standard

Eight years of heavy electric railroading have proved to the New Haven that for clean-cut, reliable current collection Phono-Electric is unexcelled.

The first Phono-Electric wire was put up in 1908 on about 4 miles on one of the tracks between Larchmont and Portchester. It is still up, and in fine condition.

The remarkable resistance to wear of the Phono-Electric contact wire in New Haven service is particularly noteworthy, because it is subject to scraping from pantograph collectors, which have been roughened by running under the old sections of **steel** contact wire.

The New Haven's opinion is reflected by two facts:

**Phono-Electric supersedes steel as new wire becomes necessary.**

**Phono-Electric is used for new work.**

Bridgeport Brass Company
Bridgeport Connecticut

Protect and Direct Your Traffic with "UNION" Signals

The TDB System of signaling fulfills all the requirements of electric railway single track operation. It provides head-on protection and at the same time permits two trains to move in the same direction, each protected by a separate signal between turnouts.

**The Union Switch & Signal Co.**

Founded by Geo. Westinghouse 1881.

SWISSVALE, PA.

Trade Mark

Hudson Terminal Bldg.
NEW YORK

Peoples Gas Bldg.
CHICAGO

Canadian Express Bldg.
MONTREAL

Candler Annex
ATLANTA

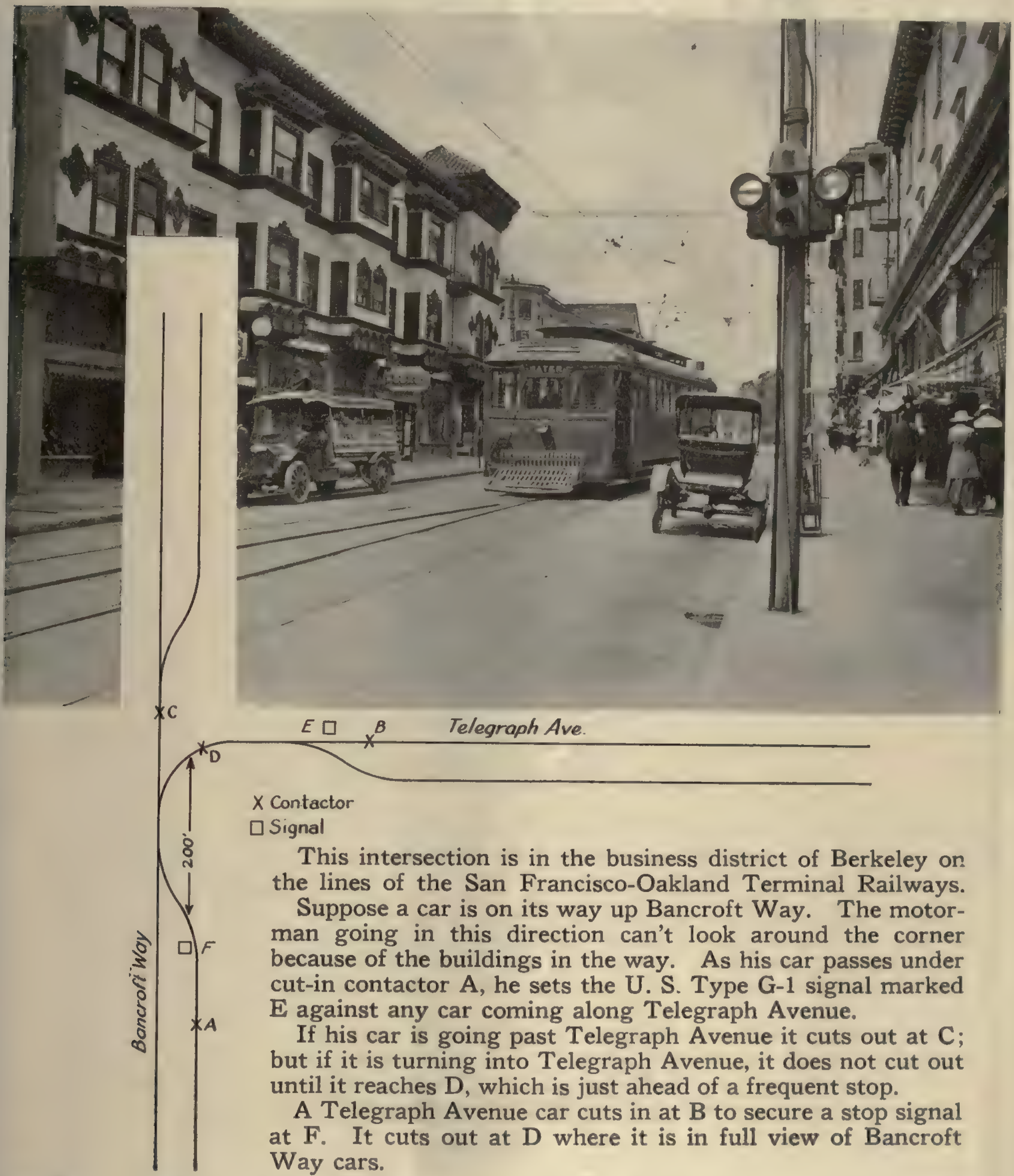
Railway Exchange Bldg.
ST. LOUIS MO.

Pacific Bldg.
SAN FRANCISCO

Represented by the GENERAL ELECTRIC CO. in Australasia, South Africa and Argentina

Trade Mark

# Where U. S. ELECTRIC SIGNALS *permit opposing cars to pass every two minutes*



This intersection is in the business district of Berkeley on the lines of the San Francisco-Oakland Terminal Railways.

Suppose a car is on its way up Bancroft Way. The motorman going in this direction can't look around the corner because of the buildings in the way. As his car passes under cut-in contactor A, he sets the U. S. Type G-1 signal marked E against any car coming along Telegraph Avenue.

If his car is going past Telegraph Avenue it cuts out at C; but if it is turning into Telegraph Avenue, it does not cut out until it reaches D, which is just ahead of a frequent stop.

A Telegraph Avenue car cuts in at B to secure a stop signal at F. It cuts out at D where it is in full view of Bancroft Way cars.

## United States Electric Signal Company

West Newton, Massachusetts
Representatives:
Western: Frank F. Bodler, Monadnock Bldg., San Francisco
Chicago: Warren Moore Osborn, McCormick Bldg.
Foreign: Forest City Electric Service Supply Company, Salford, Eng.

# A Manufacturer writes:

[From an article by L. W. Horne on "Selling Costs Should Be Reduced" in the Electric Railway Journal.]

"In many cases the master mechanic or superintendent of equipment does not see this card or any other advertising literature *because it is destroyed by some clerk* in the department before it is called to the attention of the men actually interested." Note our italics.

The Electric Railway Journal is the one great carrier of your advertising sales message that runs no danger of submarining by the office boy!

**ELECTRIC RAILWAY JOURNAL**

**invariably goes directly to your customers**

# Pure Iron For Long Service

Pure Iron Nails from the Coffin of a Soldier buried in 1792 at Ft. St. Clair, Ohio, and exhumed in 1892. After 100 years in the ground they are practically unharmed by rust. Analysis shows that they are 99.83% pure iron

## A Century in the Ground Has Not Harmed These Pure Iron Nails.

A Revolutionary soldier was buried at Fort St. Clair, Ohio, in 1792. A hundred years later the body was exhumed. The wooden coffin had almost wholly disappeared, but the nails with which it was fastened were sound and strong—almost unharmed by rust.

Analysis shows them to be **iron of high purity** (99.83%). Manganese, Copper and Sulphur are almost entirely absent.

The "Armco" Iron Corrugated Culverts here pictured were installed in Butler County, Ohio, in 1907. In 1916 a tremendous rise of the near-by river washed away the roadway, and left the pipes exposed.

The iron is today in perfect condition after ten years of hard service. This material is guaranteed to contain **at least** 99.84 per cent pure iron.

# ARMCO IRON Resists Rust

because it is the **purest** and most **even** iron on the market. Every phase of its production is governed with the utmost care and skill. It is The Iron That's Made to Last.

Write the Nearest Manufacturer for full information on Rust-Resisting "Armco" Iron Culverts, Flumes, Siphons, Sheets, Roofing and Formed Products

| | |
|---|---|
| **Arkansas, Little Rock** | Dixie Culvert & Metal Co. |
| **California, Los Angeles** | California Cor. Culvert Co. |
| **California, West Berkeley** | California Cor. Culvert Co. |
| **Colorado, Denver** | R. Hardesty Mfg. Co. |
| **Delaware, Clayton** | Delaware Metal Culvert Co. |
| **Florida, Jacksonville** | Dixie Culvert & Metal Co. |
| **Georgia, Atlanta** | Dixie Culvert & Metal Co. |
| **Illinois, Springfield** | Illinois Corrugated Metal Co. |
| **Indiana, Crawfordsville** | W. Q. O'Neall Co. |
| **Iowa, Des Moines** | Iowa Pure Iron Culvert Co. |
| **Iowa, Independence** | Independence Culvert Co. |
| **Kansas, Topeka** | The Road Supply & Metal Co. |
| **Kentucky, Louisville** | Kentucky Culvert Mfg. Co. |
| **Louisiana, New Orleans** | Dixie Culvert & Metal Co. |
| **Maryland, Munsey Bldg., Baltimore.** | Wm. M. Baker |
| **Massachusetts, Palmer** | New England Metal Cul. Co. |
| **Michigan, Bark River** | Bark River Bridge & Cul. Co. |
| **Michigan, Lansing** | Michigan Bridge & Pipe Co. |
| **Minnesota, Minneapolis** | Lyle Corrugated Cul. Co. |
| **Minnesota, Lyle** | Lyle Corrugated Cul. Co. |
| **Missouri, Moberly** | Corrugated Culvert Co. |
| **Montana, Missoula** | Montana Culvert & Flume Co. |
| **Nebraska, Lincoln** | Lee-Arnett Co. |
| **Nebraska, Wahoo** | Nebraska Culvert & Mfg. Co. |
| **Nevada, Reno** | Nevada Metal Mfg. Co. |
| **New Hampshire, Nashua** | North-east Metal Culvert Co |
| **New Jersey, Flemington** | Pennsylvania Metal Culvert Co. |
| **New York, Auburn** | Pennsylvania Metal Culvert Co. |
| **North Dakota, Wahpeton** | Northwestern Sheet & Iron Works |
| **Ohio, Middletown** | American Rolling Mill Co.<br>The Ohio Corrugated Culvert Co. |
| **Oklahoma, Shawnee** | Dixie Culvert & Metal Co. |
| **Oregon, Portland** | Coast Culvert & Flume Co. |
| **Pennsylvania, Warren** | Pennsylvania Metal Culvert Co. |
| **South Dakota, Sioux Falls** | Sioux Falls Metal Culvert Co. |
| **Tennessee, Nashville** | Tennessee Metal Culvert Co. |
| **Texas, Dallas** | Wyatt Metal Works |
| **Texas, El Paso** | Western Metal Mfg. Co. |
| **Texas, Houston** | Lone Star Culvert Co. |
| **Utah, Woods Cross** | Utah Corrugated Cul. & Flume Co. |
| **Virginia, Roanoke** | Virginia Metal Culvert Co. |
| **Washington, Spokane** | Spokane Cor. Culvert & Tank Co |
| **Wisconsin, Eau Claire** | Bark River Bridge & Culvert Co. |

**Canada:** Canada Ingot Iron Co., Ltd., Guelph, Sherbrooke, Winnipeg, Calgary.

4

ERICO
THE LINE OF LEAST RESISTANCE

# The Erico Portable Welder

## Permits No Flame or Arc to Strike the Bond or Rail

In the Erico Portable Welder the heat required for the application of the Erico Bond to the rail is transmitted from an electrode through a graphite block or plate which bears against the bond terminal, thus preventing those injuries which are liable to be caused by permitting a flame or arc to come into contact with either the bond or the rail.

**The Electric Railway Improvement Co.**
**Cleveland**

Whether It's a

Straight
5-Cent
Rate

—OR—

A reduced
Rate
Ticket

---

The

Johnson System

*handles both with equal ease*

Because the Johnson Fare Box automatically counts, on separate cyclometers, two different denominations of metal tickets as well as the nickels, dimes and pennies that are deposited in the hopper.

The metal ticket-tokens, which are made in two different sizes, are counted and indicated on two different indicators, while the cash fares are shown on another indicator. A fourth indicator totalizes all of the fares collected.

All fares are deposited in one hopper. After registration the metal tickets are at once available for resale and the cash for making change.

So many large, important electric railways have found in the Johnson System the final answer to their fare collection problems that we feel justified in asking for permission to work with and for you, too.

**Johnson Fare Box Company**
**Jackson Boulevard and Robey St., Chicago**
**50 East 42nd Street, New York**

In the electrical shop of the Los Angeles Railway.

# What Deltabeston Did at Los Angeles

Prior to 1912 the Los Angeles Railway used asbestos cotton-covered magnet wire on one of its chief types of motors.

As the cotton disintegrated through overheating, the field coil windings loosened and the asbestos covering broke down because of vibration in the coils.

You know what this meant: Excessive use of energy due to weak fields; overheating; carbonization of armature windings and flash-overs of commutators—in two words, high maintenance.

**Minimum motor maintenance** was attained and kept with the aid of 12,000 lb. of No. 3 Deltabeston wire!

You, too, can keep down your maintenance costs, whether for old or new motors, by the use of these famous products—

**Deltabeston Wire—Delta Tape—Delta Sheeting**

**Write for our wire Catalog No. 5-J.**

DELTABESTON WIRE REG. U.S. PAT. OFF.

D & W FUSE CO.

PROVIDENCE, R. I.

D&W REG. U.S. PAT. OFF.

# International *Motor*-driven

## STATION REGISTERS ARE IDEAL FOR PARK AND STATION BUSINESS

The wasteful and slow ticket-chopping system has no excuse for living since the advent of the International Motor-Driven Station Registers.

With these registers, the large percentages of people who have the exact change for fare or fee can pass on immediately, thus eliminating paper and ENCOURAGING PATRONS TO SAVE THEIR OWN TIME AS WELL AS YOURS.

As a railway man you don't have to be told what this means when you have to handle a crowd that wants to be at the ball grounds before the first pitch.

Among other installations,

**International Motor-driven Station Registers**

made possible the quick handling of 400,000 rabid baseball fans at the last World's Series; of many thousands of visitors at the Springfield (Mass.) Agricultural Fair in 1916; and now two

**El Motor-driven Station Registers have just been ordered for Diversey Beach, Lincoln Park, Chicago**

By using these Internationals, the Park Commissioners will be sure that none of the dimes for bathing suits or lockers will go astray, aside from the satisfaction of serving the sweltering Chicagoans faster than in the past.

How many uses have you for International Motor-Driven Station Registers?

**The International Register Company**
**15 South Throop Street, Chicago, Ill.**

# The Bonham Traffic Recorder

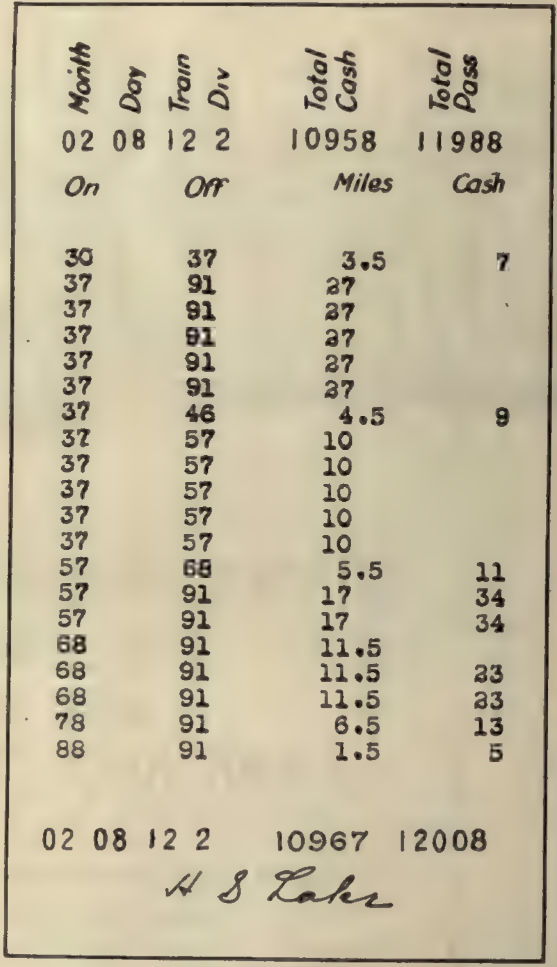
## Permits the most economical and most satisfactory distribution of interurban mileage

THE gross earnings from your interurban line or even the number of fares of each classification are a poor guide to the distribution of service.

For instance, the gross earnings may remain practically unchanged and yet the amount of riding in different sections may have changed considerably.

A record of fare classifications might show this tendency, but it would not and could not show **between** what fare points the changes were taking place.

Only the Bonham Traffic Recorder shows from trip to trip and from day to day where the passengers come from and where they go to. In other words, THE BONHAM TRAFFIC RECORDER



| Month | Day | Train | Div | Total Cash | Total Pass |
|---|---|---|---|---|---|
| 02 | 08 | 12 | 2 | 10958 | 11988 |

| On | Off | Miles | Cash |
|---|---|---|---|
| 30 | 37 | 3.5 | 7 |
| 37 | 91 | 27 | |
| 37 | 91 | 27 | |
| 37 | 91 | 27 | |
| 37 | 91 | 27 | |
| 37 | 91 | 27 | |
| 37 | 46 | 4.5 | 9 |
| 37 | 57 | 10 | |
| 37 | 57 | 10 | |
| 37 | 57 | 10 | |
| 37 | 57 | 10 | |
| 37 | 57 | 10 | |
| 57 | 68 | 5.5 | 11 |
| 57 | 91 | 17 | 34 |
| 57 | 91 | 17 | 34 |
| 68 | 91 | 11.5 | |
| 68 | 91 | 11.5 | 23 |
| 68 | 91 | 11.5 | 23 |
| 78 | 91 | 6.5 | 13 |
| 88 | 91 | 1.5 | 5 |

02 08 12 2 10967 12008

H S Lake

# Offers a Continuous Traffic Survey

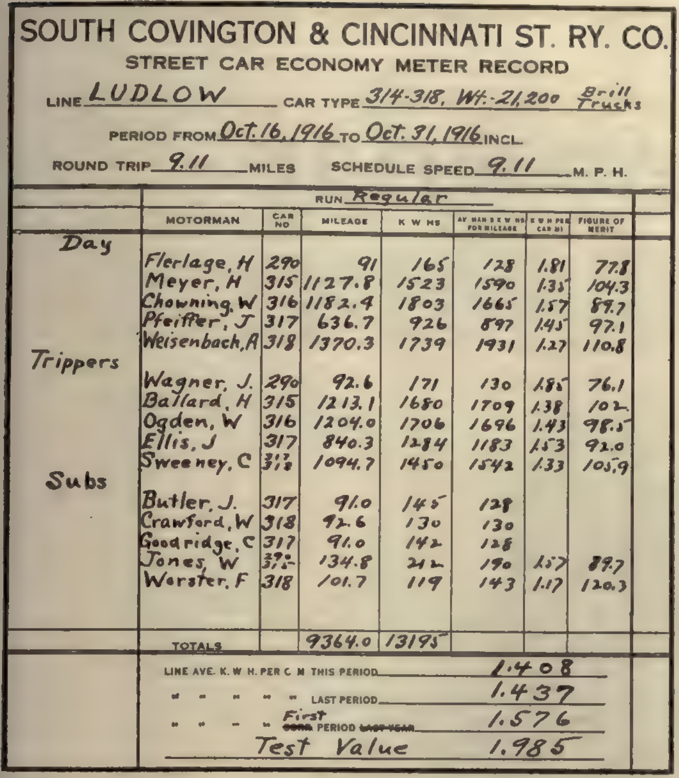
Operating One of the Setting Rods

which enables its users to adjust the car service to the demands of the public—giving, say, an hourly service on one section, a two-hour service on another section, and so on, thereby

*Satisfying the*
*Passengers*
*and Eliminating*
*Waste Mileage*

## The Bonham Recorder Co.

**Hamilton, Ohio**



SOUTH COVINGTON & CINCINNATI ST. RY. CO.
STREET CAR ECONOMY METER RECORD
LINE *LUDLOW* CAR TYPE *314-318, Wt.-21,200 Brill Trucks*
PERIOD FROM *Oct. 16, 1916* TO *Oct. 31, 1916* INCL.
ROUND TRIP *9.11* MILES SCHEDULE SPEED *9.11* M. P. H.
RUN *Regular*

| | MOTORMAN | CAR NO | MILEAGE | K W HS | AV. MAN'S K W HRS FOR MILEAGE | K W H PER CAR MI | FIGURE OF MERIT |
|---|---|---|---|---|---|---|---|
| Day | Flerlage, H | 290 | 91 | 165 | 128 | 1.81 | 77.8 |
| | Meyer, H | 315 | 1127.8 | 1523 | 1590 | 1.35 | 104.3 |
| | Chowning, W | 316 | 1182.4 | 1803 | 1665 | 1.57 | 89.7 |
| | Pfeiffer, J | 317 | 636.7 | 926 | 897 | 1.45 | 97.1 |
| | Weisenbach, A | 318 | 1370.3 | 1739 | 1931 | 1.27 | 110.8 |
| Trippers | Wagner, J. | 290 | 92.6 | 171 | 130 | 1.85 | 76.1 |
| | Ballard, H | 315 | 1213.1 | 1680 | 1709 | 1.38 | 102 |
| | Ogden, W | 316 | 1204.0 | 1706 | 1696 | 1.43 | 98.5 |
| | Ellis, J | 317 | 840.3 | 1284 | 1183 | 1.53 | 92.0 |
| | Sweeney, C | 317<br>318 | 1094.7 | 1450 | 1542 | 1.33 | 105.9 |
| Subs | Butler, J. | 317 | 91.0 | 145 | 128 | | |
| | Crawford, W | 318 | 92.6 | 130 | 130 | | |
| | Goodridge, C | 317 | 91.0 | 142 | 128 | | |
| | Jones, W | 290<br>315 | 134.8 | 212 | 190 | 1.57 | 89.7 |
| | Worster, F | 318 | 101.7 | 119 | 143 | 1.17 | 120.3 |
| | TOTALS | | 9364.0 | 13195 | | | |

LINE AVE. K. W. H. PER C. M. THIS PERIOD *1.408*
" " " " " LAST PERIOD *1.437*
" " " " *First* ~~SAME~~ PERIOD ~~LAST YEAR~~ *1.576*
*Test Value* *1.985*

# South Covington & Cincinnati St. Ry. Co.

## Saves Energy and Equipment by Using

# ECONOMY METERS

The sample meter record shown here is reproduced from an article on the meter equipment of the South Covington & Cincinnati Ry. Co. published in "The United News"—a monthly magazine for employees.

Note that the K.W.H. per car mile has been reduced from 1.576 to 1.408, a saving of 10.66%. Further savings are expected as the campaign progresses.

**The article concludes—"It is felt that the investment in Economy Meters will be justified for the following reasons:**

**"Safe car operation will be promoted.**

**"Comfort of the passengers will be increased.**

**"The interest in correct car operation will be stimulated, and this will be accompanied by a more careful attention to the car conditions, such as brake setting, bearing wear, motor armature trouble, etc., from which a very considerable saving will result.**

**"It has been demonstrated that a saving in power is possible, the extent only of which is to be determined."**

**Why not promote similar economies for your company?**

ECONOMY
SANGAMO
BUILT LIKE A WATCH
SANGAMO
METERS

**Sangamo Electric Company**
**Springfield, Illinois**

**Specialists in Meters for Every Electrical Need**

# *Human Engineering*

"Problems in human engineering will receive during the coming years the same genius and attention which the nineteenth century gave to the more material forms of engineering."

—THOS. A. EDISON.

Mr. Edison's words are true. Successful electric railway men agree with him and we agree with him. We have solved one very important problem in human engineering, and the solution of that problem is the Ohmer System. The Ohmer System protects the income of electric railways. It reduces fare collecting to a scientific basis. The Ohmer System is not a machine. A machine, the Ohmer Fare Register, is only a part of it. The register does all that any machine can do or should do. It produces complete, accurate and untamperable records of every transaction between passengers and conductor. It indicates the character of each transaction clearly and publicly. The Ohmer System allows human nature to work only in one direction, toward carefulness, honesty and efficiency. It prevents human nature from failing through temptation. It does this by making the conductor discover for himself that his best interests are served only when he serves his employer best. The Ohmer System is our triumph of human engineering.

**Ohmer Fare Register Company**
**Dayton, Ohio**

# DURADUCT

## Car Wiring Conduit

## Is Easiest and Cheapest to Install

**There are few jobs more tedious to the workman than making the scores of bends and threadings required in metal conduit for car wiring.**

**And every hour that your men require for conduit bending and threading has to be paid for.**

**The flexibility of Duraduct eliminates all this labor cost automatically.**

**Because Duraduct is a non-raveling conduit which can be bent and cleated by hand to any desired curvature.**

TUBULAR WOVEN FABRIC COMPANY
MANUFACTURERS —— PAWTUCKET, R. I.
GENERAL SALES AGENT — A HALL BERRY
71-73 Murray St., New York. 9 So. Clinton St., Chicago

*Northern Electric Company* LIMITED Distributors for Canada

# The Arthur Powe

## Saves Power, Brake Shoe
## of Operation by Encouragin

It achieves these results by automatically recording the **amount of time** in minutes for which brakes are applied and by recording the **number of times** brakes are applied during a run.

It is extremely simple. Entirely mechanical. Requires only one instrument per car.

It is held in place by a single screw and is connected to the train pipe by a short length of ¼-inch pipe much in the same way as the

## *Its advantages may b*

**It encourages coasting**
for the motorman soon learns that under equal conditions the man who coasts the most must of necessity have his brakes on the least.

**It eliminates unnecessary stops and slow downs**
as instance when one car follows a preceding car too closely.

**It therefore saves power**
by indicating the operator who uses the least power for maintaining a given schedule.

**It develops safety by maintaining proper headway**
The operator soon learns that following a preceding car too closely forces him to more frequent use of brakes and makes a bad record for him, when compared with a man who has exercised greater caution.

**It checks excessive speed**
A motorman soon learns that unnecessary "speeding up" entails more frequent and longer brake applications, which give him a bad record on both dials.

**It encourages use of hand brake at end of run**
This essential safety rule is often neglected by motormen. Its observance when the Arthur Power-Saving Recorder is in use gives the operator a better record. In fact, in this instance as in others, the motormen who observe the rules most closely get the best record.

**If interested in power-saving, investigate the merits**

*"The power wasted at the brakeshoes is*

**The Arthur Power-Saving Recorder Co.**
**New Haven, Conn.**

# -Saving Recorder

## and Wheels, Increases Safety
## Motormen to Run Cars Properly

pressure gauge is connected. Absolutely no auxiliary equipment is needed, and the complete cost of labor and material for installation is very small.

It is in service on 200 cars of the Connecticut Company, and its use is now being extended to cover the whole system of this company, i.e., it will shortly be in operation on practically all cars in the State of Connecticut.

Showing recorder location on one of the cars of the Connecticut Company

## summarized as follows:

**"Fanning the air"**

One of the worst habits of a motorman is "fanning the air," as it is called. This consists in throwing the brakes on and off when making a stop instead of stopping smoothly. This results in the uncomfortable jerking about of passengers, and in addition wears away brake valves, seatings, governors, compressors, compressor motors, etc. It also wastes compressed air and wastes power by requiring the more frequent pumping up of the reservoir. All of this is annoying and wasteful. The Recorder checks this, for each time a motorman "fans the air" the device registers one against him, as well as lengthens his braking period. The device effectively eradicates this bad habit.

It encourages the use of sand on slippery rails and so lessens the possibility of flat wheels.

It educates operators to take frogs and switches at proper speed and so decreases risk of derailments.

It teaches motormen to observe condition of equipment closely and report defects promptly.

It gives motormen an incentive to observe the rule for draining air tanks when car goes to barn and consequently decreases risk of injury to piping and tanks during freezing weather.

It operates uniformly on any car without regard to size or weight of car, gear ratios, wheel diameters, and thereby greatly simplifies clerical work in figuring and keeping motormen's records.

It does the work and does it well, being mechanically simple, with few parts to get out of order, both its first cost and maintenance cost is relatively low.

**his new Recorder. Its simplicity will appeal to you.**

*ue index of the motormen's relative efficiency"*

**The Arthur Power-Saving Recorder Co.**
**New Haven, Conn.**

# SLAM! BANG! CRASH!!

Ever watch conductors rush through a car at the end of a run to reverse the cross-seats?

Isn't it a fact that many of them look upon this job as something to be done with all the brute force at their command?

That kind of mauling thirty to thirty-five times a day, ten thousand times or more a year, can be withstood successfully only by

## Hale and Kilburn "Walkover" Reversing Mechanism

This is not an empty claim. It is a fact that we have proved on a number of seats, by reversing them through an electrically operated arm. This arm actually reversed the back with much more force than would be exerted by the ordinary conductor.

**234,000 COMPLETE REVERSALS**

backward and forward, of the Hale & Kilburn No. 400 seat were obtained in one test, without injury to the seat; while 202,600 complete reversals were obtained with the Hale & Kilburn No. 300 seat before the first indication of wear.

If you want to avoid jammed seat-backs, you want Hale & Kilburn mechanism—the only seat mechanism which has been found capable of withstanding more than 200,000 reversals without trouble—a record well ahead of the useful life of a car seat.

**Hale and Kilburn "Walkover" Seat Mechanism**
**Calls for Least Maintenance**

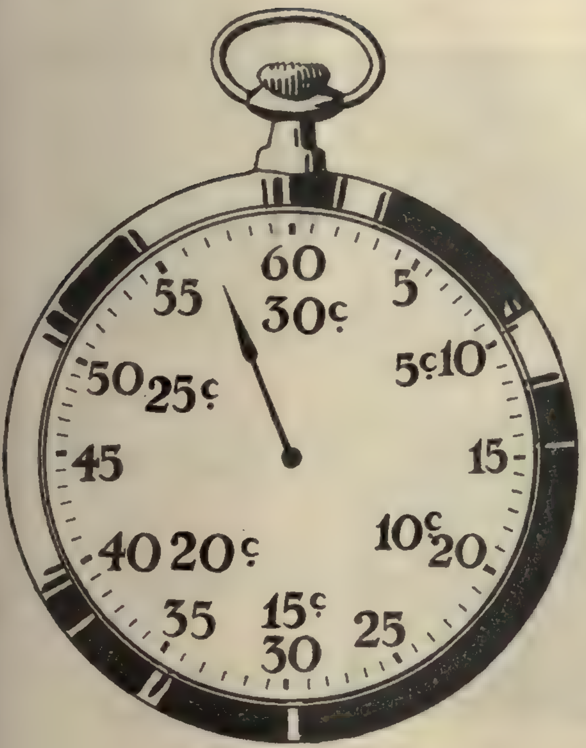
*Pioneers in Steel Trim for Passenger Cars, including interior finish, steel doors, etc.*

WALKOVER
COPYRIGHTED

## Hale and Kilburn Co.

PHILADELPHIA NEW YORK CHICAGO
WASHINGTON ATLANTA SAN FRANCISCO

WALKOVER
COPYRIGHTED



Equip Your Lines Completely with

**National Pneumatic Door and Step Control**

*To Cut Running Time and Get More Car Miles*

The **partial** adoption of National Pneumatic Door and Step Control means much to the passengers and platform men on the individual cars equipped.

But to take full advantage of the reduction in stopping time made possible with National Pneumatic Control, **every** car on a given route should be equipped.

By lowering the stopping time of **all** cars instead of operating types with varying speed of passenger interchange, a faster, safer schedule is possible, with a resultant increase in car miles per hour.

**NATIONAL PNEUMATIC COMPANY**

50 Church St. New York

515 Laflin St. Chicago

Notice particularly the Headlining

THIS is an interior view of one of the new high-speed cars just put into service by the Jamestown, Westfield and North-Western Railroad.

Among several notable features which mark the efficiency and up-to-dateness of these cars is the use of

**Nevasplit for Headlinings and Wainscoatings**

"Nevasplit" is, first of all, a wood fibre.

It won't warp or shrink, it has no grain so will not split or "check." Its smooth, even surface takes paint readily.

**What is Nevasplit**

"Nevasplit" is waterproof and of minimum conductivity. It is absolutely uniform in texture. "Nevasplit" is NOT veneered lumber but wood fibre in the highest form of refinement, possessing constructional features and beauty of appearance that makes its use an

**Essential for Headlining, Insulation Roofs and Interlining of Cars**

To specify "Nevasplit" means a positive saving of money.

*Let us send samples of "Nevasplit" so you can see with your own eyes the advantages of this material for YOUR cars.*

**THE KEYES PRODUCTS COMPANY**

120 BROADWAY, NEW YORK

NEW YORK
W. R. Kerschner Co., Inc.
50 Church St.

CHICAGO
J. E. Simons
Fisher Bldg.

SAN FRANCISCO
Ford & Geirrine
Merchants Exchange Bldg.

ITALY
American Traffic Co.
Via Capuccini, #4, Milano, Italy

## The Motorman Knows That

# The Rico Coasting Recorder

### Shows the Analysis of "Schedule Time" Components

To understand the wonderful possibilities of the Rico Coasting Recorder, we must bear in mind that there is nothing mysterious about the components of what is called "Schedule Time." They are simply:

The aggregate of the power-on periods
The aggregate of the brakes-on periods
The aggregate of the standing-time periods

And what is left is

The aggregate **coasting** period, the total of which depends upon the skill of the motorman—and this coasting is measured only by the Rico Coasting Recorder.

Note, too, that every one of these components of **"Scheduled Time,"** and particularly coasting,

IS WITHIN THE COMPREHENSION
OF THE MOTORMAN

Furthermore, every component of "Schedule Time" is a **time** factor, whether power-on, brakes-on, standing or coasting, for

## Time is the Essence of Railroading

RAILWAY IMPROVEMENT CO. RICO 61 BROADWAY, NEW YORK

# Interesting Properties of G-E Coils

## Steam Moulded

Every G-E coil is steam moulded. This process cements the turns together, preventing all chafing and insures correct shape. Experience has shown that steam moulded G-E coils have a life 25% longer than other makes which do not use this process.

## Dipped Leads

The leads of G-E coils are dipped in a waterproofing compound. This serves two purposes—it keeps all moisture away and prevents unraveling of the insulation.

## Perfect Fit

Because all G-E coils are made of the same material and with the same care, they fit perfectly the motor they are designed for. They can be pressed snugly into the armature slots without injury due to forcing.

# General Electric Company

Atlanta, Ga.
Baltimore, Md.
Birmingham, Ala.
Boston, Mass.
Buffalo, N. Y.
Butte, Mont.
Charleston, W. Va.
Charlotte, N. C.
Chattanooga, Tenn.
Chicago, Ill.
Cincinnati, Ohio
Cleveland, Ohio
Columbus, Ohio
*Dallas, Tex.
Dayton, Ohio
Denver, Colo.
†Detroit, Mich.
Des Moines, Iowa
Duluth, Minn.
Elmira, N. Y.
Erie, Pa.
*El Paso, Tex.
Fort Wayne, Ind.
Hartford, Conn.

**General Office: Schenectady, N. Y.**

ADDRESS NEAREST CITY

*Houston, Tex.
Indianapolis, Ind.
Jacksonville, Fla.
Joplin, Mo.
Kansas City, Mo.
Knoxville, Tenn.
Los Angeles, Cal.
Louisville, Ky.
Memphis, Tenn.
Milwaukee, Wis.
Minneapolis, Minn.
Nashville, Tenn.
New Haven, Conn.
New Orleans, La.
New York, N. Y.
Niagara Falls, N. Y.
*Oklahoma City, Okla.
Omaha, Neb.
Philadelphia, Pa.
Pittsburg, Pa.
Portland, Ore.
Providence, R. I.
Richmond, Va.
Rochester, N. Y.
St. Louis, Mo.
Salt Lake City, Utah
San Francisco, Cal.
Schenectady, N. Y.
Seattle, Wash.
Spokane, Wash.
Springfield, Mass.
Syracuse, N. Y.
Toledo, Ohio
Washington, D. C.
Youngstown, Ohio

*Southwest General Electric Company. †General Electric Company of Michigan.
For CANADIAN BUSINESS refer to Canadian General Electric Company, Ltd., Toronto, Ont.
GENERAL FOREIGN SALES OFFICES, Schenectady, N. Y.; 30 Church St., New York City; 83 Cannon St., London, E. C., England.

7180

# Electric Railway Journal

Published by the McGraw-Hill Publishing Company, Inc.
Consolidation of STREET RAILWAY JOURNAL and ELECTRIC RAILWAY REVIEW

Volume 50 NEW YORK, SATURDAY, JULY 7, 1917 Number 1

## Follow-Up Work with Inefficient Motormen

RECENTLY we discussed the possibility of maintaining the interest of motormen in car-checking devices by showing them the direct connection between higher efficiency and higher wages. However, the financial inducement is not the only one. A great deal can also be obtained by personal follow-up work. When a motorman is showing a low coasting average, and consequently high energy consumption, without apparent reason, it will prove more effective to ride with him in person instead of ride him by correspondence. This implies that an experienced car operator should be at or near the head of the department for, after all, knowledge of transportation conditions is the *sine qua non* in the analysis of coasting. It is far better to approach an inefficient motorman with the attitude of "let me see if you and I can't find out what's wrong with the car and the run." The average individual is bound to appreciate this man-to-man policy. If the instructor, who is quite green to the run, does better than the regular operator, the latter will be a peculiar individual indeed if he does not vow to learn and apply the secrets of efficient car operation.

## Forehandedness in Service Capacity Now Paramount

IT was recently pointed out in these columns that the present seemed to be a good time for the electric railway companies which are in position to sell power at a profit to build up their commercial energy load by taking on some of the small isolated plant loads. The latter are harder pressed in the way of coal and supplies in these times than are the large corporations and in many cases may be quite ready to turn the worries of coal and oil and labor supply over to another. There are, of course, two sides to this subject. Lucky is the commercial power company to-day that has much generating and transformer capacity to sell. One manager of a small Indiana electric railway recently stated that he was 5000 kw. of transformer capacity behind his needs and could not get any help. This is only typical of the general condition. The answer to the situation is purely a matter of forehandedness. With conditions in the industry favoring a rapid increase of the commercial lighting and power load on electric railway plants, advantage should be taken of these conditions, and this can be done if the needs for equipment to supply this business are anticipated far enough in advance. Forehandedness is of paramount importance in these abnormal times.

## Clear the Streets for Trolley Traffic

IN the rush of problems relating to higher fares, preparations for national defense and other conditions brought on by the war, the efforts of electric railways to secure relief from traffic delays caused by street congestion should not be relaxed. This problem is one which concerns cities of moderate size equally with those of metropolitan character. Indeed, the conditions may often be worse in the smaller cities because, as a rule, less attention is given in them to the enforcement of traffic rules. One of the most irritating features of the situation is that the present vehicular interference is to a large extent avoidable. In one state at least the electric car has legally a superior right on the streets to the public, whether on foot or in vehicles. This superior right is based partly on the fact that the electric car cannot turn out or leave its tracks, but also because the possession of such a right is in the interest of the public as a whole. This point cannot be too strongly emphasized in any discussion of street congestion. The more quickly the cars get over the line, the better the public is served. Let us have more strict regulation, then, against street congestion, especially against that most serious evil, being committed in practically every city in the country, of automobile owners parking their cars on narrow traffic streets.

## Durability of Porcelain Transmission Line Insulators

THE discussion at the A. I. E. E. meeting last week on line insulators was a bit discouraging to those who focus attention too fixedly on the difficulties which are being encountered in this field. We prefer to look at the marvelous progress that has been made, as the insulator has been improved step by step to keep pace with the demand for higher and higher transmission voltage. Once the physical characteristics of the insulator itself limited this voltage, but now the limit is set largely by general economic conditions. Insulators can be built for any voltage within reason, but of course the higher the voltage the more expensive and less durable will be the insulators and other elements of the system. It is unfortunate that porcelain, still the best material available for high-tension insulator making, should be so susceptible to the subtle, as well as violent destructive actions of the elements. Its virtues for insulating purposes are so great, however, that the exhaustive studies of its properties which are being made by experts throughout the country are justified and inevitably will bring even finer results than they have brought so far. The microscope and the polariscope, as well as the mechanical testing machine and high-voltage electrical apparatus, have all been pressed into service and the effect is being felt. Quartz has been suggested as a substitute for porcelain and has some elements of promise, but until everything possible has been done to attain perfection in porcelain manufacture and in its utilization there is no reason to abandon it. Its record has been highly creditable. To be sure, the life of porcelain in insulator service is not infinite, and the present maintenance costs on early transmission lines may be high. But there is nothing unique about this as the same situation has developed in every rapidly advancing art, and the insulator engineers can be relied upon to "keep up with the procession."

## Are City Cars Made for Collisions or Passengers?

WE sat in lately on a rather heated discussion which might best be designated by the title presented. The scrap began with the wail of a car builder that if one of the "tin cans" which a competitor was building ever got into a collision, the consequences would be such as to kill both the passengers and the "tin can" school of car building at one blow. His opponents readily admitted that some designs of recent cars were of feather weight but not of feather noiselessness. "Here," they said, "is room for improvement in springs and shock absorbers, but we deny the implication that the first consideration in building a city car is to make it collision-proof. It is our contention that the basic consideration in building a car for city service is to carry passengers. Why should a car be built with the idea that although held to a well-defined track it is going to be the target of crazed Fords and demented motor trucks? Are automobiles being made collision-proof?"

For our part, we believe that for unit-car city service the weight of a car should be fixed fundamentally by conditions of load, speed and track and only secondarily by considerations of longevity and resistance to collisions. As to longevity, we are beginning to feel that longevity in city cars, due to extra heavy framing and plates, has been overdone to the point of hindering the widespread adoption of cars which are more efficient operating units. We have seen one company spend $1,200 to remodel a five-year-old 50,000-lb. car when it would have been far wiser to have junked the car for a faster, safer and more economical design of one-third the weight. It is not on record that manufacturers tinker and retinker a machine tool until it wears out. They buy the newer, better ones outright. If railways learn to look at street cars in the same way, namely, as a production unit, measured by passenger and car-mile output at such and such comparative costs, they will put less money in dead metal and more money in equipment for high acceleration, quick braking and automatic operation.

As to collisions, what are the real figures? Is it not a fact that cross-track collisions are relatively scarce and that both cross-track and front-end collisions are less likely with a light, quick-braking car than with a heavy, slow-braking car? We suspect also that claims from vehicle owners for heavy damages will sound less reasonable when traction battleships disappear. Front-end collisions are largely under the control of the motormen. There may or may not be significance in the fact that on a certain railway the cars which have practically no collision protection for the motormen enjoy fewer rundowns than the cars which do have such protection. Too strong a sense of security can be quite as bad as no security at all.

## An Affiliated Association for the Manufacturers?

LAST week the executive committee of the American Association reaffirmed its approval of the formation of an affiliated association for the manufacturer members and invited them to organize such an association. If they do so there will be three manufacturers in the executive committee, including the president of the affiliated Manufacturers' Association. In reaching its decision the executive committee had practically a choice among only three plans, involving an affiliated association, or an autonomous but closely-related separate association, or a manufacturers' committee in the main association to handle exhibits.

If the manufacturers accept the invitation of the parent association and organize as an affiliated association, a modification of the original general purpose of the group of affiliated associations adopted when the association was reorganized in 1905 will be necessary. The thought at that time was that the affiliated associations were to investigate technical questions. This is shown by article XII of the by-laws, which states that "the association shall do all in its power to promote the welfare of other associations organized with its approval to investigate technical matters connected with street and interurban railway construction and operation." Obviously the manufacturers have no separate technical interests in the sense intended in the by-law, such technical problems as they do have requiring their co-operation with the appropriate affiliated association, either the Engineering or the Transportation & Traffic Association.

The main function of the manufacturers as far as the association is concerned is to manage the exhibit feature at the conventions. Assuming that the association follows the proposed plan, a form of charter and constitution quite different from that of the other associations will be necessary. In the preparation of this charter every effort should be made to give the manufacturers virtually all of the rights and privileges which they enjoyed in a separate organization. It is desirable, therefore, in fact it is essential, that the plan of the suggested organization be formulated at once and laid before the industry for careful study in all of its bearings. Only such procedure will form a safe and sure foundation for a permanently satisfactory action on the application. The railway men should apply to the manufacturers the same principles which we have urged them to apply to the public and strive for better public relations. To make any plan a success it must appeal to the manufacturers as the best one available, one which encourages their initiative and accomplishes their purposes in belonging to the association.

The manufacturers are now company members of the American Association. By and large they have accepted the idea of unity throughout the industry and are paying their dues into the association on the same basis as the railway men. This is right and proper. The industry is in a bad way. If all parts of it do not hang together very soon they will "hang separately." There is no time or room for dissensions and destructive work. All thinking and work should be constructive in the interests of the industry as a whole. As far as the absorption of the manufacturers into the American Association is concerned the thing has been done. The executive committee of the parent association determined upon a plan or method of procedure. The manufacturers stood for it in principle but deplored the methods used. They felt that they should have been consulted beforehand. But as we have said the time for debate has gone by, and now all, manufacturers and railway operators, should put their shoulders to the wheel and devote their best efforts to the interests of the industry.

## The Railway Prayer—Give the Commissions Vision

AS a rule, we are only indirectly interested in steam railroad rates, but the 15 per cent rate decision handed down on June 29 by the Interstate Commerce Commission has made an unusual impression upon us. In it there is an important outlining of rate-making philosophy of direct concern to all instrumentalities that must submit their rates to public approval. In the majority and minority opinions, three views of rate regulation are expressed—views which ought to be called to the attention of all electric railways.

The first is that expressed in the majority opinion. According to this, the record does not disclose the existence of a situation requiring "so heroic a remedy" as a 15 per cent increase in rates. To the commissioners' minds, the revenue showing seems better now than it did last February, and although many operating expense symptoms are "unquestionably unfavorable" and "much or all of what some railways believe will occur, will occur in the future," no one can know in advance. The absence of protests against the proposed increase the commissioners dismiss as without significance as a basis in rate-making, inasmuch as this indicates simply "a state of the public mind." Hence they refuse to grant more than a modicum of relief, but promise to keep an eye on the monthly returns to see whether the carriers' fears are justified. This is undoubtedly an honest view, but it is narrow and inadequate. As Commissioner Harlan states in a separate opinion, it is a "month-to-month and purely statistical" view.

For the next view let us look at the dissenting opinion of Commissioner McChord. He believes that the need of higher rates is a matter of government policy, and not of the making of reasonable rates. He asks whether the commission should approve an increase predicated upon prophecies in order to strengthen railway credit or whether the prices of materials and supplies should be regulated by Congress. Until the apprehensions of the railways are realized and it is clear that Congress will not act in the matter, he says, the commission is not justified in burdening the public with increased rates. This view is not so narrow as that of the majority, for it recognizes, although in a halting way, the desirability of a general investigation of operating cost tendencies rather than a short-sighted scrutiny of monthly statistics. But the view is of one without initiative, without a sense of personal responsibility in the full exercise of delegated powers. Rate making is now a commission, not a legislative matter. Whether Congress will or will not regulate prices is not the issue. Be the operating costs high or low, the commission should give them full consideration in establishing the rate basis.

What a different view from the others is the third one! Commissioner Harlan, concurring in the majority opinion only because his vote was necessary to give the carriers even the relief therein granted, thinks it not "safe" to take merely a narrow statistical view of the railways' need. With some operating factors undoubtedly unfavorable, he states, the wisdom of deferring full relief is not apparent. The country needs railway development, not simply because of war's exigencies, but because of its growing business. The shippers are ready for higher rates, provided they secure better service. And he adds: "A rate is a public question, and existing rates could well be advanced in the public interest. As long as we look to private interests to furnish transportation service, we must see to it that the rewards are sufficient to attract capital for its further development."

Which of these views is really constructive? Which is based on a realization of responsibility not to shippers, not to carriers, not to politicians, but to public welfare? Without question, the broad and wholly commendable view is that of Commissioner Harlan. The points he makes are vitally important to electric railways as well as steam railroads. Even now public service commissioners are considering in many places the need of higher electric railway fares. What will be their attitude? Will they be statistical fanatics, or will they try to shift their duties to the legislatures, or will they attempt in a broad-minded, far-seeing way to meet the basic public need of improved transportation facilities? We profoundly hope that their attitude will be that last stated, for, to paraphrase the proverb of a wise man of old, "where there is no vision, the railways perish."

# "Better Service" Brings $70,000 Freight Business in Third Year

## Some of the Policies and Methods Employed by a Western Road to Attract Freight Traffic to a New 75-Mile Electric Line Are Related, Also an Account of How Severe Competition Was Overcome

By J. F. HOLMAN
General Freight Agent Kansas City, Clay County & St. Joseph Railway

IT is a well-established fact that the steam railroads derive the major part of their earnings from the freight business, while electric roads depend chiefly on the passenger business for any profit. Should electricity be substituted for steam motive power, electric railroads might be declaring dividends earned in a great measure from the handling of freight. This would seem to indicate that the motive power is not the determining factor as to which branch of the business should be most profitable. There can be no question but that electric lines have solved the problem of making passenger traffic pay; likewise, steam railroads have been particularly successful in the handling of freight traffic. But the reverse in either case should be likewise a profitable pursuit and the railway managers could well devote their principal efforts toward building up the weak side of the transportation business.

It is my opinion that there is a large field for improvement by electric roads in the development of freight business. This means, of course, more motive power, large, adequate terminal facilities, sidings for industrial locations, joint rate and traffic arrangements with other carriers. The electric roads maintain their high efficiency in the passenger business by giving "better service," and this will necessarily be the key to a larger increase in the freight business.

The Kansas City, Clay County & St. Joseph Railway is located in a reasonably thickly populated country, with terminals at Kansas City, St. Joseph and Excelsior Springs, Mo. The farmers raise a surplus of grain, livestock, poultry and fruits. The company enjoys an enviable passenger traffic, and has a freight business which is on a par with the higher-grade electric interurban railroads in this country. It is hoped, however, to make it a freight as well as a passenger road, and it is to this end that the writer is working.

This road started operation in 1913. Located, as the property is, in a highly competitive territory, it was necessary to establish first the idea of "better service." By advertising it as "express-freight service," demonstrating to the shipper the advantages of such service, and giving special attention to complaints such as are bound to be made by shippers, the business has been increased continually since the operation of the road was begun.

Dependent upon local conditions in the different territories, it is necessary and possible to work out many features which will stimulate the movement of freight. Among some of the more important ones that have had the desired effect on this property are those described in the following paragraphs.

TYPICAL GRAIN ELEVATOR AND BUILDING MATERIAL INDUSTRIES

### COMBINATION ELEVATORS, LUMBER AND SUPPLY YARDS

Not long after this road began operation there arose a demand for interchange with some steam railroad which would give joint rates on carload movements of grain and other commodities, in and out of a territory not heretofore served by any steam railroad. Joint rates and traffic agreements were made with the Chicago, Great Western Railroad, which parallels this line a portion of the way to St. Joseph, thereby giving especially advantageous connections with the productive sections of the country through which the electric road runs. A reliable grain man became interested and erected three elevators at different points along the road. However, before the elevators were erected at suitable points and the through rates could be put into effect, it was necessary that ten of the side tracks along this road be moved to points adjacent to the public highways. The farming communities along the line were glad to assume this entire expense, and in some cases the cost was as much as $2,000 per switch.

The elevators were built, and in addition lumber yards and coal bins were erected where coal, sand, stone and other building material could be handled at great convenience to the farmers. Shipments to and from these establishments are handled chiefly in foreign equipment and under joint rates, this road receiving a percentage of the joint through rate.

The arrangement made with the steam railroad was on the basis of car service, rather than under the per diem rules, which permits of our company having a foreign car practically three days without expense to us. Even where expense occurs it is usually borne by the shipper chargeable with the delay. In view of the fact that it is possible for this road to interchange with only one steam railroad the plan is satisfactory, but if we interchanged with more than one road some different plan would have to be made.

### RAISING OF FRUITS ENCOURAGED

For the last two years we have made various efforts to interest the farmers in the growing of apples and small fruit, but until recently with little success. We find the farmers in Missouri have through generations been so accustomed to raising wheat, corn and livestock that it is difficult to interest them in fruit culture, or even in dairy farming. However, we now have two large commercial orchards along the line, and will have more as these develop. It so happens that the soil along the K. C., C. C. & St. J. Ry. has a deep layer of loess, which is the best-known soil for raising fruit, particularly apples, grapes and berries. A soil survey is being made under State supervision, and it is hoped that it will be completed this year in order to show the people along the line the value of the natural soil which has not been utilized heretofore for anything other than raising grains. When this survey is completed, a copy of the report will be furnished each of the landowners, and this should encourage the raising of fruits and vegetables, and materially increase the freight traffic on this road.

### A NEW SCHEME FOR INCREASING DAIRY FREIGHT TRAFFIC

A novel scheme for increasing the general interest in dairy farming which has been given considerable attention during the last six months is the organization of calf clubs at various points along the line. The calf club plan had never before been promoted by any railroad to my knowledge, but already two Western steam roads have taken up this subject after attendance at our meetings in this vicinity by their representatives. The plan, as it is being carried out here, had its inception in Illinois last year, where it was promoted by a few enterprising bankers, with the idea of obtaining better dairy cattle and more of them, and also of interesting and bringing the people's attention to that branch of farming. The results were so pleasing that bankers all over the State are now organizing calf clubs. More than 200 clubs have been organized since Jan. 1. Clubs that were organized last year returned gross profit of nearly 100 per cent, the one at Brightton, Ill., doing even better. Eighty-four boys and girls were furnished calves at an average price of $43 per head, and these were sold in the fall at an average price of $92.30. The calf club plan on this road was developed as follows:

Dairy meetings were held at various points along the line, and calf clubs were organized. The co-operation of the local banker is the first step in the organization of a club. The general plan is for the banker to buy heifer calves of a recognized dairy breed, and sell them to the farm boys and girls on time, taking their notes, guaranteed by their fathers or guardians. These graded heifer calves are sold to the boys and girls in the spring, with the understanding that late in the fall they are to be sold at public auction. From the proceeds of the sale the amounts of the notes with accrued interest and the expenses of running the club are to be deducted, and the balance goes to the boys and girls.

The services of Edward K. Slater, former dairy and food commissioner of Minnesota, now connected with the educational department of the Blue Valley Creamery Company, Chicago, who has been identified with the calf club promotion work in Illinois, were secured. He addressed various meetings and aroused great interest not only in the calf clubs but in dairying generally. Great difficulty is now being experienced, however, in securing the calves for the several clubs organized. The interest of the whole community is aroused when a calf club is started. The boys and girls become more interested in the farm, and increased interest on their part means a new enthusiasm for dairying on the part of the parents. By becoming a member of a club, the child becomes the owner of property that he can call his own, and he takes a greater interest in the business end of farming. Great good is sure to result from the organization of these clubs. I quote from a letter written by a little girl who was a member of the Brighton Calf Club last year:

AT THE CALF CLUB PUBLIC AUCTION IN THE FALL

"I am glad I can join your calf club again this year, and glad that my two brothers can, too, because a boy cannot associate with a nice calf all summer without being a better boy."

In the year 1915 the Blue Valley Creamery Company shipped over this line 1399 cans of cream. In 1916 it shipped 1796 cans. This represents cream only, shipped to the one creamery. It is not necessary to tell the average railroad manager whether the handling of milk and cream on the road is profitable or not.

### FREIGHT EQUIPMENT AND SERVICE

The freight equipment on this road consists of five steel motor cars, five standard box cars and five flat and gondola cars, all used in local service. All interchange freight is handled in foreign cars. This company does not supply any cars to the steam railroad. Two local freight trains each way daily are operated over each of the two divisions of this line, one a distance of 28 miles, between Kansas City and Excelsior Springs, and the other a distance of 52 miles, between Kansas City and St. Joseph. All carload movements are handled by the ordinary express car, so that the mileage is kept down to a minimum. At times when freight becomes congested it is handled at night, but this is a rare occurrence.

Below is a comparative statement of earnings, taken from the yearly report for 1916, showing earnings based on road-miles, car-miles, ton-miles, etc.

Car-Mile, Ton-Mile and Road-Mile Earnings

| | Year 1916 | Year 1915 |
|---|---|---|
| Total miles of road operated | 75.75 | 75.75 |
| Total freight car-miles (trailer-miles inclusive) | 130,317.49 | 129,593.96 |
| Total tons handled | 24,320.5 | 19,886.5 |
| Total tons 1 mile | 803,354 | ........ |
| Average gross revenue per ton | $2.888 | $3.01 |
| Average gross revenue per ton-mile | 0.0873 | ........ |
| Average revenue per freight car-mile (gross) | $0.5388 | $0.4622 |
| Average revenue per mile of road (gross) | $926.94 | $790.79 |

Comparative Earnings per Shipment

| | | |
|---|---|---|
| Number shipments forwarded | 86,358 | 81,209 |
| Gross revenue, forwarded | $70,215.97 | $59,902.35 |
| Average gross revenue per shipment | $0.8131<br>$0.7376 | $0.7376 |
| Difference | $0.0755 | or 10 per cent increase |

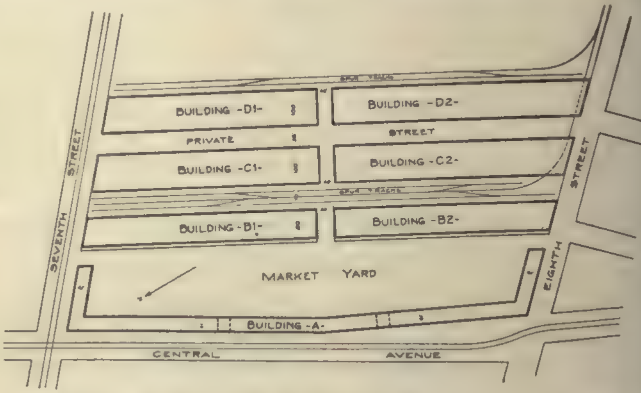
# Bringing the Railway and Its Freight Customer Together

## Los Angeles Union Terminal Company Is Now Building Fireproof Warehouses, in Which the City's Chief Wholesale Business Will Be Centered

FOLLOWING the example of the Bush Terminal Company, New York, and the Piedmont Lines, Charlotte, N. C., a company was recently formed at Los Angeles, Cal., to build a group of storage warehouses in the most favorable location for railway handling and distribution. This, the Los Angeles Union Terminal Company, is the largest project of its kind west of Chicago. It owns 19 acres of land in one parcel adjacent to the main lines of the Pacific Electric Railway and Southern Pacific Company in a fast-growing city, whose population already is around the half-million mark. This land is in the wholesale district, and only half a mile from the retail center, where the chief wholesale thoroughfare to-day has no trackage facilities whatsoever.

### Character of Buildings

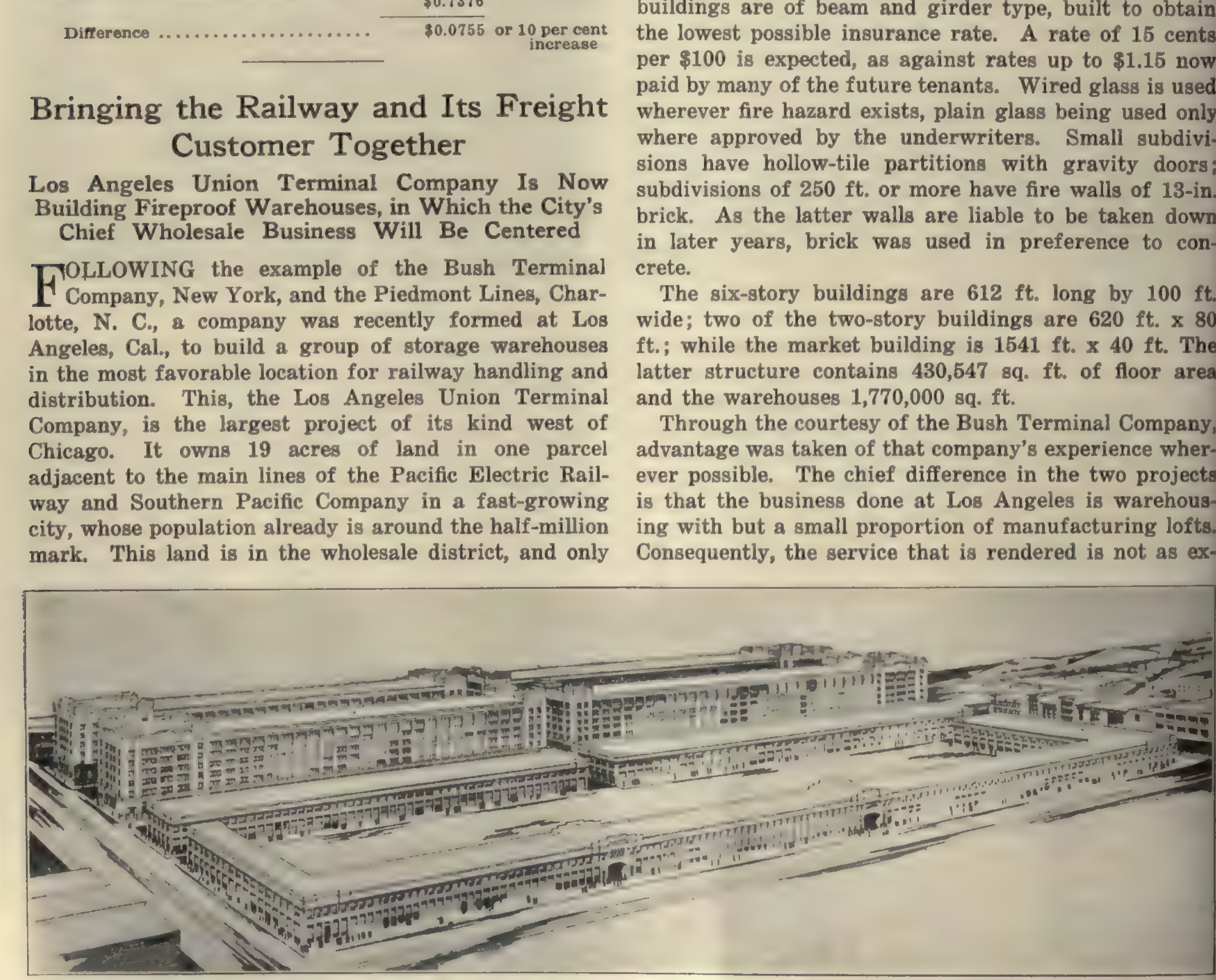
The first group of buildings now under construction comprises three six-story warehouses and three two-story market buildings, all of reinforced concrete. The latter buildings are peculiar to the local conditions, as they are designed to be utilized by the Los Angeles Public Market. Like the Bush Terminal Company's structures, which they resemble in many ways, the six-story buildings are of beam and girder type, built to obtain the lowest possible insurance rate. A rate of 15 cents per $100 is expected, as against rates up to $1.15 now paid by many of the future tenants. Wired glass is used wherever fire hazard exists, plain glass being used only where approved by the underwriters. Small subdivisions have hollow-tile partitions with gravity doors; subdivisions of 250 ft. or more have fire walls of 13-in. brick. As the latter walls are liable to be taken down in later years, brick was used in preference to concrete.



LOS ANGELES TERMINAL WAREHOUSES—PLAN OF BUILDING

The six-story buildings are 612 ft. long by 100 ft. wide; two of the two-story buildings are 620 ft. x 80 ft.; while the market building is 1541 ft. x 40 ft. The latter structure contains 430,547 sq. ft. of floor area and the warehouses 1,770,000 sq. ft.

Through the courtesy of the Bush Terminal Company, advantage was taken of that company's experience wherever possible. The chief difference in the two projects is that the business done at Los Angeles is warehousing with but a small proportion of manufacturing lofts. Consequently, the service that is rendered is not as ex-



LOS ANGELES TERMINAL WAREHOUSES—ARCHITECTS DRAWING OF PROJECTED CONSTRUCTION tensive as that supplied by the Bush Terminal to its tenants.

The layout of the first group of buildings and the architect's sketch are reproduced in two accompanying illustrations. From these it may be seen that switching and private tracks, as well as private streets, are provided to permit unloading directly into each building on the ground floor level. There is no switching charge. Chutes lead to the basements, while large electric elevators are provided either for general or private use, according to the nature of the lease. A crane will care for extra-heavy material.

Although the buildings were not scheduled for completion before Nov. 1, 1917, the company had rented on April 24 about two-thirds of the space to some sixty tenants. Most of these tenants are wholesale houses, which have grown so rapidly with Los Angeles that few have been able to expand at some one good location. Thus, one company which owned a building had been obliged also to rent an equal amount of space elsewhere. The terminal warehouse plan not only assures such concerns a low rental, excellent transportation facilities, and a fireproof home, but also enables them to concentrate their business. Furthermore, it is easier to provide for future growth.

The leases run from one month to fifty years, the larger concerns usually taking the longer leases. The amount and character of service, such as lighting, elevators, battery trucking, telpherage, etc., will be arranged in accordance with the wishes of the tenant, but of course these are details which will largely settle themselves with experience.

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# Strike and Union Agitation Fail in Denver

### Employees Have a Brotherhood Organization, in Effect a Local Union—Faith in Their Own Ability to Look After Their Interests and Sense of Fairness They Feel Toward Company, Because of Voice Had in Its Affairs, Defeat Strong Attempt to Bring About Affiliation with Amalgamated Association

THE issue of ELECTRIC RAILWAY JOURNAL for March 31, 1917, carried a news report of the organization of a brotherhood of the Denver Tramway employees. The real significance of this organization was not evident to the casual reader at that time, and not until the developments of the last few weeks was the far-reaching influence of this brotherhood toward company loyalty disclosed. In these few weeks came the test and the proof of the principles on which the organization was built up. The chronicle of events during this period tells the story.

After weeks and weeks of the most determined effort on the part of union organizers or trouble agitators (call them what you will), direct from the Detroit headquarters of the Amalgamated Association of Street and Electric Railway Employees to establish a footing for an affiliated chapter of the national union, the interest of a few men from the 700 or more trainmen was enlisted. These few delegated, without authority, a committee of five men to present the demands of the Denver Union, No. 746, boldly heralded as having been organized, to General Manager Frederic W. Hild. This committee was received by Mr. Hild on June 4, while the newspapers were filled with the news of a threatened strike. An agreement was tendered to the company covering a period of one year and providing for a raise of wages from the present maximum of 31 cents to a new maximum of 40 cents an hour for trainmen and a 20 per cent increase for carhouse, shop and track men. It also provided for recognition of the union and strongly hinted that unless Mr. Hild gave answer by 9 o'clock the next morning a walkout would result immediately. Then witness the statement signed by this same committee in the morning papers June 5:

> We, the undersigned committee appointed to represent the Amalgamated Association of Street and Electric Railway Employees, find that matters are not as represented and hereby advise our fellow workmen and trainmen not to attend any meetings called for the purpose of organization, but we do believe that all these matters can best be handled through our own brotherhood. We have resigned from the committee.

Then witness further the set of resolutions adopted at a meeting of the local brotherhood, attended by 450 employees on June 5, expressing loyalty to their own organization and repudiating the acts of the committee which represented the Amalgamated Association:

> Whereas, a committee claiming to represent the employees of the Denver Tramway Company waited upon F. W. Hild, general manager of said company, on June 4, 1917, and at said time submitted a set of demands upon the tramway company, signed by said committee, and outsiders having no connection whatever with the tramway company,
>
> And, Whereas, the said committee was not authorized to represent the employees of the tramway company or the members of the tramway brotherhood:
>
> Now, therefore, Be it Resolved by the trustees and members of the Tramway Brotherhood of Denver, Col., all employees of the Denver Tramway Company, in this meeting assembled, that the aforesaid action of this committee was entirely without warrant or authority.
>
> Further Resolved, that we do hereby reaffirm our allegiance to said brotherhood and particularly the purposes and objects thereof as set forth in Article 1 of the by-laws, as follows:
>
>> Section 1. Recognizing, as citizens, that duty to the community of Denver and vicinity, and as employees, that obligations to the Denver Tramway system require that the transportation service rendered by the Denver Tramway Company shall be safe, continuous and reliable, and that frank, friendly meetings and intercourse between employees and officials are the best means of promoting harmony of effort and preventing and removing possible misunderstandings,
>>
>> And believing and being convinced that the employees of the Denver Tramway system have sufficient ability and business judgment to manage their own affairs, and represent and look after their own interests, without interference by or affiliation with any other individual or organization, and, furthermore, that these objects and purposes can be best pursued and accomplished by mutual co-operation and conference between employees and officials. * * *
>>
>> Section 2. The basic principles of this brotherhood are:
>>
>> First—Mutual and helpful co-operation by and among all the employees, the officials and the management of the Denver Tramway Company and its affiliated companies.
>>
>> Second—That the individual members of this brotherhood, each for himself, and upon his honor as a man, and attested by his signature, agrees to carry out and further the above and foregoing principles.
>
> Further Resolved, that we believe the members of said committee acted under a misapprehension of the facts, and we hereby approve their resignation from said committee.
>
> Further Resolved, that a copy of these resolutions be sent to the Denver Tramway Company and the press of the city.

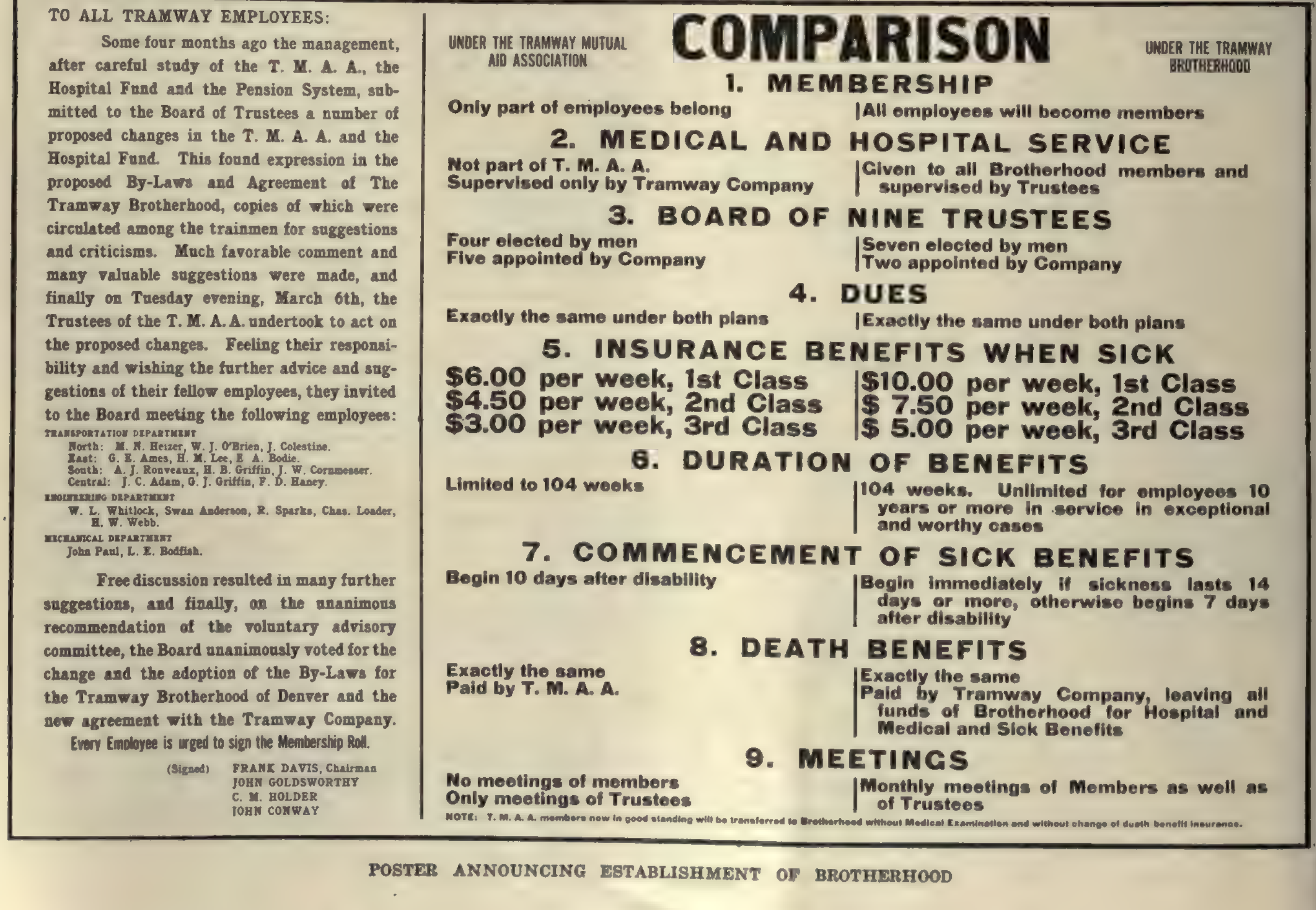
When these resolutions had been passed reassuring Mr. Hild of the good faith of his employees, he suggested that a committee be appointed to take up the matter of wages and working hours with the management in accord with the routine provided in the constitution and by-laws of the brotherhood. Thus was the aid of an outside, unsympathetic, selfish body rejected and Mr. Hild's persistent faith in the fairness of his employees reaffirmed.

### Developing the Denver Brotherhood

With the above recitation of events as the proof of the course the Denver Tramway Company has taken to gain the lasting confidence of its employees and thus avoid strikes and all the contingent discomforts to company and public, the nature of the organization, its aims, its benefits, its accomplishments, will be of interest. In passing, it is only fair to point out that not all of the road to amicable relations was traveled under the direction of the present management, but rather, that the former management handed down a group of loyal men and a very good feeling between company and employees as a basis for Mr. Hild's further work. There was formerly an organization of the trainmen only known as the Tramway Mutual Aid Association which offered certain sickness, death, pension and hospital benefits. This organization was controlled by the company, although the employees were represented on the board of trustees.

Mr. Hild sensed the need not long after he took charge of the property for an organization which would comprise all the employees of the company and would be controlled by them, the management having a minority representation on the board of trustees. He had in mind an organization of such a nature that it would in effect be a local union of the employees, yet be more to their advantage than affiliation with any national labor union would be. It would give every employee a voice in the conduct of those company affairs pertinent to the employees, and in this his principal object was to make the men feel that they had a perfect right to voice their opinions and then to provide a place for this discourse to meet with official recognition. Mr. Hild has a very firm conviction that with proper guidance, employees can be counted upon to be absolutely fair in their dealing with the company and that the more confidence there is placed in them, the less trouble there will be. Hence he was entirely willing to provide a common meeting ground for company and employees, and then welcome and encourage a free expression of the thoughts of the men—an assembly popular in both senses of the word. Such an arrangement takes away all the argument for membership in a labor union, and this was openly expressed as one of the motives for the organization of the company brotherhood.

So, with the Tramway Mutual Aid Association as the ground work for the new organization, a rough draft of the by-laws of the proposed brotherhood designed to supplant the Mutual Aid Association was laid before the trustees of the T. M. A. A. who circulated copies of the proposed new by-laws among the men. Then, after some four months of more or less discussion, the trustees of the Mutual Aid Association took up the matter for final action. A voluntary advisory committee of twenty employees from all departments of the company was called in and the by-laws gone over point by point, thoroughly studied and discussed, and thus was evolved in final form the existing by-laws of the present Tramway Brotherhood of Denver. These men, through their participation in the detailed discussion, were enabled to



TO ALL TRAMWAY EMPLOYEES:

Some four months ago the management, after careful study of the T. M. A. A., the Hospital Fund and the Pension System, submitted to the Board of Trustees a number of proposed changes in the T. M. A. A. and the Hospital Fund. This found expression in the proposed By-Laws and Agreement of The Tramway Brotherhood, copies of which were circulated among the trainmen for suggestions and criticisms. Much favorable comment and many valuable suggestions were made, and finally on Tuesday evening, March 6th, the Trustees of the T. M. A. A. undertook to act on the proposed changes. Feeling their responsibility and wishing the further advice and suggestions of their fellow employees, they invited to the Board meeting the following employees:

TRANSPORTATION DEPARTMENT
North: M. N. Heizer, W. J. O'Brien, J. Colestine.
East: G. E. Ames, H. M. Lee, E. A. Bodie.
South: A. J. Ronveaux, H. B. Griffin, J. W. Cornmesser.
Central: J. C. Adam, G. J. Griffin, F. D. Haney.

ENGINEERING DEPARTMENT
W. L. Whitlock, Swan Anderson, R. Sparks, Chas. Loader, H. W. Webb.

MECHANICAL DEPARTMENT
John Paul, L. E. Bodfish.

Free discussion resulted in many further suggestions, and finally, on the unanimous recommendation of the voluntary advisory committee, the Board unanimously voted for the change and the adoption of the By-Laws for the Tramway Brotherhood of Denver and the new agreement with the Tramway Company.

Every Employee is urged to sign the Membership Roll.

(Signed) FRANK DAVIS, Chairman
JOHN GOLDSWORTHY
C. M. HOLDER
JOHN CONWAY

**COMPARISON**

| UNDER THE TRAMWAY MUTUAL AID ASSOCIATION | UNDER THE TRAMWAY BROTHERHOOD |
|---|---|
| **1. MEMBERSHIP** | |
| Only part of employees belong | All employees will become members |
| **2. MEDICAL AND HOSPITAL SERVICE** | |
| Not part of T. M. A. A.<br>Supervised only by Tramway Company | Given to all Brotherhood members and supervised by Trustees |
| **3. BOARD OF NINE TRUSTEES** | |
| Four elected by men<br>Five appointed by Company | Seven elected by men<br>Two appointed by Company |
| **4. DUES** | |
| Exactly the same under both plans | Exactly the same under both plans |
| **5. INSURANCE BENEFITS WHEN SICK** | |
| $6.00 per week, 1st Class<br>$4.50 per week, 2nd Class<br>$3.00 per week, 3rd Class | $10.00 per week, 1st Class<br>$ 7.50 per week, 2nd Class<br>$ 5.00 per week, 3rd Class |
| **6. DURATION OF BENEFITS** | |
| Limited to 104 weeks | 104 weeks. Unlimited for employees 10 years or more in service in exceptional and worthy cases |
| **7. COMMENCEMENT OF SICK BENEFITS** | |
| Begin 10 days after disability | Begin immediately if sickness lasts 14 days or more, otherwise begins 7 days after disability |
| **8. DEATH BENEFITS** | |
| Exactly the same<br>Paid by T. M. A. A. | Exactly the same<br>Paid by Tramway Company, leaving all funds of Brotherhood for Hospital and Medical and Sick Benefits |
| **9. MEETINGS** | |
| No meetings of members<br>Only meetings of Trustees | Monthly meetings of Members as well as of Trustees |

NOTE: T. M. A. A. members now in good standing will be transferred to Brotherhood without Medical Examination and without change of death benefit insurance.

POSTER ANNOUNCING ESTABLISHMENT OF BROTHERHOOD go out and talk intelligently about the new association among their fellow employees. In the same manner, the plan was explained to employees of other departments, and in his talks with the men Mr. Hild very plainly said that the plan was directly opposed to affiliation with other labor unions or dictation or interference by outside organizers as is evidenced in the opening section of the by-laws of the brotherhood and quoted in an earlier paragraph in the resolutions passed by the men in repudiation of the recent work of the amalgamated association in Denver. By his very frankness of speech he won the confidence of the men that there was no "nigger in the wood pile," but that the idea was simply to provide the employees with all the advantages of membership in a labor union and more but retain to the company the privilege of dealing directly with its own employees in any matters of difference instead of being forced to negotiate through the medium of a national organization very remotely interested in the success of the company as a business enterprise.

Finally, a petition, which simply obligated the men to later join the brotherhood and adhere to the by-laws governing the association and to recognize and submit to the change from the Mutual Aid Association to the brotherhood, was sent to each division of the transportation and to all other departments for the men to sign. Posters placed in the division headquarters and in various offices over the property, and reproduced herewith, set forth the principal points of comparison of the two organizations and showed conclusively the advantages offered the employees in the new association. Within forty-eight hours after the petitions were sent out, 98.5 per cent of the employees had signed. Of the remainder 1 per cent were out of the city and signed later upon their return, and twelve men refused to sign, having reasons of their own which they refused to express. A significant thing is the fact that not a single trainman refused to sign. With this acceptance of the plan, its formal adoption was made on April 26, when officers were installed and the board of trustees elected.

### ORGANIZATION AND OPERATION OF THE BROTHERHOOD

The object of the brotherhood as set forth in its by-laws are threefold: The first is to provide for the relief of its members in case of sickness, injury or disability and to provide benefit in the event of death; the second is to promote social relations and good fellowship among the members and to secure such business benefits for its members as may be attained by co-operation and conference between employees and officials; and the third is to aid in the education of its members in all matters pertaining to a general knowledge of street and electric railways, their equipment and operation, and to promote the best conduct of the business of the Denver Tramway Company for the mutual advantage of the tramway brotherhood and the company.

Every employee of the company, regardless of department or rank, is included in the membership of the brotherhood as long as he remains an employee and pays the dues provided in the by-laws. Before being entitled to any benefit of the organization, all members are required to subscribe to the membership roll and agree to support the by-laws of the organization.

The management of the brotherhood is vested in a board of trustees consisting of nine members, of whom four are elected from the transportation department, giving a representative from each of the four divisions, one member from the mechanical department, one member from the ways and structures division of the engineering department, one member from the power department, and the president and treasurer of the brotherhood. The general manager of the tramway company is *ex-officio* president of the brotherhood, while the auditor holds the office of treasurer in like manner. The seven trustees representing the various departments of the company are elected through the process of primary and regular election, for periods of two years. This arrangement gives a popular representation on the board of trustees of four representatives for approximately 1000 transportation department men and three representatives for the 650 men in other departments.

The board of trustees holds at least one regular meeting each month, and each board member is paid the sum of $1 for attendance at the regular meeting. A monthly meeting of the entire membership of the brotherhood is held, and it has been the intention to concentrate all activities of the employees in this one meeting, in the hope that by reducing the number of meetings the interest would be increased in the one. The programs at the brotherhood meetings are, therefore, made to include all phases of the company activities, including the A. E. R. A. company section technical papers, social activities, safety discussions, and the business meeting of the brotherhood at which the discussion of any grievances is encouraged.

### BENEFITS AND COSTS

Membership in the brotherhood requires participation in the medical, surgical and hospital benefits, and all employees are required to pass a physical examination before being accepted. The dues for medical, surgical and hospital service are 50 cents a month for all members. For insurance benefit against sickness, injury or disability, the dues are $1 a month for members whose average monthly earnings are $80 or more, 75 cents a month for those whose average monthly earning is between $60 and $80, and 50 cents per month for members whose average monthly earning is less than $60. These dues entitle a member to a benefit of $10, $7.50 and $5 per week respectively for the three classes, extended over a period of time as shown in the poster reproduced on page 8. Death benefits of $1,000, $750 and $500 for the three classes respectively are carried by the company for the benefit of the members of the brotherhood. When death benefits are due the payments are made by the company into the treasury of the brotherhood, which in turn disburses these mortuary funds to the beneficiaries. Providing he has passed the prescribed medical examination, a man is accepted for insurance as soon as he is hired by the company. When payment of pensions to employees is made it is accepted in place of insurance and death benefits and releases the company and the brotherhood from all other obligations. Pensioned employees, however, are entitled to medical, surgical and hospital service, provided they continue to pay dues into the brotherhood during the time they are pensioned.

The collection of dues is made by the company for the brotherhood without charge by deducting the amount from the pay checks of all those employees who are paid regularly by check. The trainmen pay voluntarily out of their own pocket the amount of the dues between the first and fifteenth of each month.

NEW MELBOURNE TRAMWAY—METHOD ADOPTED FOR POLE ERECTION, AND VIEW SHOWING SUBSTRUCTURE AND SUBSOIL DRAIN FOR TRACK

# A Recent Australian Tramway

**This New Australian Electric Line Includes 12 Miles of Track Laid with 90-Lb. Rail on Hewn Ties—Standard Span-Wire Construction Has Been Installed for the Contact System, and the Cars Are Similar to the California Type Used on the Pacific Coast**

By STRUAN ROBERTSON, Assoc. Mem. Inst. C. E.
Engineer and Manager Melbourne, Brunswick & Coburg Tramways

THE new Melbourne, Brunswick & Coburg Electric Tramway is the most recent example of Australia's semi-suburban electric railways. Melbourne, with its suburbs, has a population of roughly 600,000 people, but there is no central municipal control, since it is cut up into several small cities, towns and boroughs, and each of these has its municipal affairs controlled by its own elected council. The system of control adopted for new projects has by an act of Parliament been constituted a tramways trust, whose members are elected by the municipalities concerned. The tramways have been constructed and are being operated under these controls in the interests of their constituent bodies. The capital for construction was obtained by loans advanced on the securities of the various municipalities concerned.

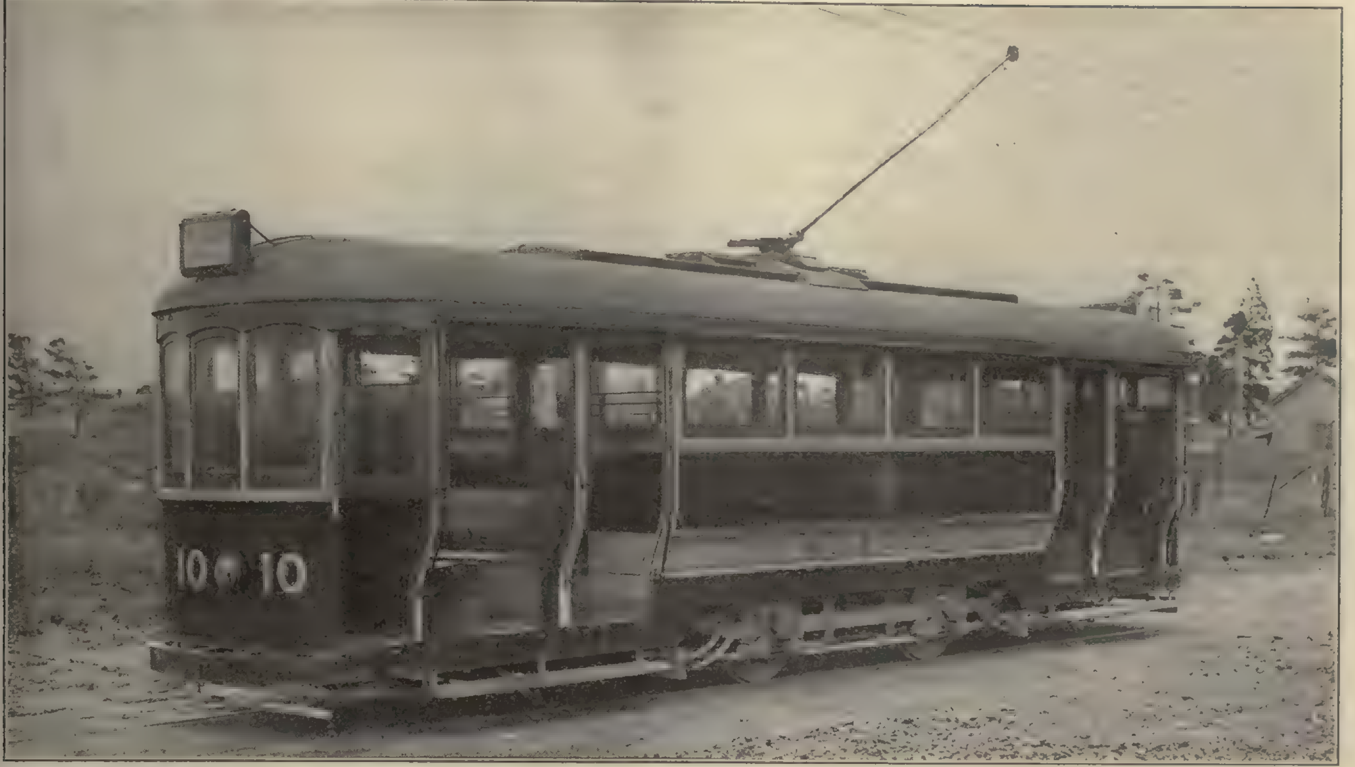
The new tramway has a total route of 7 miles, of which 5 miles are double-track and 2 miles single-track, making 12 track-miles in all.

The permanent way construction has several special features that are unusual in Australasian construction. Among these is the use of a subsoil drain of agricultural tiles with frequent outfalls. This has been provided for the full length of tracks. In addition, an 8-in. depth of graded ballast has been used below the ties. For pavement of the roadway adjoining the rails a "gilsonite" asphaltic-concrete surfacing has been adopted, vitrified bricks being installed against the rails to prevent the asphalt surface from being broken down along the line of contact between the rail metal and the paving.

The rails weigh 90 lb. to the yard, and they are British standard, grooved-girder section on tangent track. A similar type of rail weighing 96 lb. to the yard is used on all curves of less than 150 ft. radius. The rail heads are curved with a radius of 12 in. The sharpest curves on the system are of 50 ft. radius. On curves of 60 ft. radius or less the inside rail is fitted with a removable, rolled manganese-steel flange. All rails are made of silicon steel, under the Sandberg patents.

For the ties native hardwoods, *i.e.*, red gum, iron bark and gray box are used. All ties are hewn and they are spaced on 27-in. centers. It is expected that the ties will have thirty years of life.

NEW MELBOURNE TRAMWAY—VIEW OF SUBSTATION SWITCHBOARD



NEW MELBOURNE TRAMWAY—COMBINED OPEN AND CLOSED CAR

No tie bars or brace plates are used, and the heaviest axle load is not more than 8 tons.

Overhead construction is of side-pole span type. Steel poles are used throughout 5 miles of the route, and native iron-bark poles, neatly dressed, on the other 2 miles of the route. Non-fouling trolley wire with mechanical ears has been adopted.

A 5000-volt, three-phase, 50-cycle current supply is purchased from the electric supply department of the Melbourne City Council. Payment is made on a maximum demand system at a price which works out to approximately 2 cents per alternating-current unit delivered. The tramway has installed its own substation, which is equipped with two 200-kw. rotary converter sets, a 50-kw. general service power and lighting transformer and two 10-kw. series transformers for track lighting, the whole being controlled from a handsome black-slate switchboard. All the substation equipment has been supplied by the Australian General Electric Company, Ltd., Melbourne, representing the General Electric Company, New York. Space has been provided for increasing the capacity of the substation to 1600 kw.

NEW MELBOURNE TRAMWAY—VIEW SHOWING DEPOT YARD, OFFICE BUILDING AND CAR STORAGE for traction purposes when the growth of traffic makes this necessary.

At present there are twelve cars in service. These are mounted on single trucks of the Brill 21-E type, having 7-ft. rigid wheelbase and 33 in. rolled-steel wheels. The car bodies were manufactured in Australia and are of the combination saloon and open type, having a seating capacity of forty-four. The over-all length is 35 ft., and the weight is 23,500 lb. Each car is equipped with two GE-241 box-frame motors rated at 55 hp. This motor capacity enables the car to maintain with five stops per mile a schedule speed of 12 m.p.h. Other features of the equipment are form K controllers and GE straight-air brakes. These cars are the first street railway equipments in Melbourne to be fitted with pneumatic brake equipment.

One carhouse serves the entire property. This includes under one roof storage for twenty cars, a workshop fitted with a 200-ton wheel press, a wheel lathe, an 8-in. lathe, a radial drill press, a sensitive drill, an emery and buffing wheel, and a wet emery stone. All of these tools have individual direct motor drives from three-phase, 50-cycle, 415-volt induction motors. The same building contains the substation, store, offices for staff and a messroom for the men. The complete installation, which was designed by and constructed under the supervision of the writer, was completed and placed in regular service on Oct. 28, 1916.

## A Cartoon Summarizing Current Conditions

The accompanying drawing, made for this paper by John F. Burroughs of Baltimore, Md., tells its own story.

As the readers of the ELECTRIC RAILWAY JOURNAL know full well, the line which must operate on a 5-cent fare is pitilessly bombarded by rising wages and costs of materials, well typified, as the artist has done here, by the dirigible and the airplane raining destruction from the clouds.

HOW MUCH LONGER CAN A 5-CENT FARE LINE SURVIVE?

## The Librarian's Real Duties

### President Brush Outlines the Value of a Company Library and Competent Librarian to the Executive and His Staff

IN a comprehensive address delivered on June 25 by Matthew C. Brush, president of the Boston (Mass.) Elevated Railway, before the Special Libraries Association at Louisville, the importance of the duties of the so-called librarian, properly executed, were pointed out. The address appears in full in the June issue of *Special Libraries*, published by the association. It may be said here that the Boston Elevated Railway has an extensive and up-to-date library, and President Brush is no doubt in a position to speak of its possibilities as an efficient information bureau. In his opinion, the employees of the company must necesarily depend on the librarian to make readily available to them such information as pertains to their business, and they should be made to feel that such material will be placed at their command. They should be made to feel further that instead of supplying information as a favor, the librarian is always glad to be of assistance; that he welcomes the inquiry of an office boy as well as the perplexing questions of an expert, and that he will continue to work in their behalf when once he knows their wants.

To all the different members of the staff of the company the librarian can be no less helpful, provided his familiarity with the business is broad enough to enable him to look at it from different points of view and understand, to some extent at least, the problems of each official. His particular duty should be to acquaint himself with the needs of the staff and to bring to their attention new articles of interest of which it has been his opportunity to learn. The staff should feel that they can confide in the librarian many details regarding their problems in order that the latter can work advantageously in securing desired information. To this end he, having knowledge of the lack of material on certain subjects, should co-operate with the editors of periodicals in order to remedy the condition. Moreover, with a knowledge of the needs of the staff he would be much more able to detect articles bearing upon the business of the company, which would otherwise appear to be of no interest.

The librarian can do much, Mr. Brush said, to lighten the work of an executive, who would thereby have more time to give to his greater responsibilities. In so doing, information should be presented in a form digested or abstracted so that it could be grasped by the executive with the greatest economy of time. The librarian can even recommend to his company ideas which he notes from his reading have been successfully applied by other concerns. The importance of this service was expressed by Mr. Brush in the following statement:

"In fact, the so-called librarian can build a place for himself in every firm, corporation or company, if he desires to do so, and if he possesses an intimate acquaintance with the various methods of getting information aside from books, periodicals, pamphlets, etc., standing as he should at the elbow of an executive, demonstrating his ability to advise how various matters have been viewed by different minds and reporting why certain schemes were a success or failure, it would seem as if a more fitting title could be thought of for him than that of librarian."

# Insulator and Cable Problems Discussed by A. I. E. E.

### At a Business Session of the American Institute of Electrical Engineers Held in New York on June 27 and 28 Insulator Deterioration and Cable Heating Were Among the Topics Taken Up

A BRIEF business convention of the American Institute of Electrical Engineers this year took the place of the regular annual convention which had been scheduled to be held at Hot Springs, Va., during the latter part of June. The meeting was held in New York and consisted of two days of reading of papers and discussions on a list of topics of limited range.

There was no session devoted to electric railways, but a number of the papers contained much of value to those responsible for the power end of the electric railway business. Among these were a group of four papers on high-tension cables, and another group of three papers on high-tension insulators. A number of the salient points in the papers and the discussions which may be of interest and value to electric railway men are summarized below.

> "The rapid development of the art has rendered much transmission apparatus obsolete, and the insulator is by no means an exception. When in addition to this, we take into consideration that little is generally known even at the present time as to the conditions under which the insulator has to operate and the necessary properties in same to withstand these conditions, it is surprising that the insulator has reached its present state of perfection."
>
> —A. O. AUSTIN
>
> "The continued and seriously high rate of deterioration occurring in all parts of the country in high-voltage suspension insulators of the cap and stud type, has caused investigators in their efforts toward the design of a durable insulator, to make a more careful study of the problem than heretofore. * * * In view of the number of factors involved * * * it is not only natural, but in fact a favorable sign of active and thorough investigation, that somewhat different views may at first be held as to the predominating causes of insulator deterioration by those engaged in making such studies."
>
> —J. A. BRUNDIGE

## DETERIORATION OF HIGH-TENSION INSULATORS

The three papers on the subject of high-tension insulators covered largely the same trouble, namely, insulator deterioration. That was the subject of one by J. A. Brundige, Electric Bond & Share Company, who discussed particularly expansion effects as a cause of deterioration. The engineers of this company have arrived at the belief that expansion effects are causing the major part of insulator deterioration. Expansion in the steel studs on hot days is doubtless responsible for much of the trouble. Expansion also takes place inside insulator caps where Portland cement has been used for assembling. Such expansion in cement was clearly indicated in some experiments cited by the authors where numerous hair cracks were found to have developed throughout the mass of cement briquettes due to expansion and contraction under varying moisture conditions.

As evidence confirming Mr. Brundige's contention, he called attention to the following facts: No evidence of importance is at hand showing that electrical stresses have caused deterioration. In general, losses of insulators in service do not bear any apparent relation to the degree of firing of the porcelain. Deterioration appears to take place quickly and, as slightly porous wear absorbs moisture only slowly, large numbers of insulators would undoubtedly have been discovered in the intermediate resistance stages if porosity were the predominating cause of failure. Cracks of more or less long standing have been identified in the majority of cases where it has been possible to carry on post-mortem examinations on defective insulator units. The relatively good showing made by some earlier types of insulators indicate that porosity is not the factor of most immediate concern.

## QUARTZ SUGGESTED AS SUBSTITUTE FOR PORCELAIN

The general insulator situation was summed up by W. D. Peaslee, consulting engineer, Portland, Ore., who believed that four factors are of predominant importance in connection with deterioration, as follows: Mechanical stresses due to temperature changes and moisture; dielectric flux concentration due to improper design and to defects in the porcelain; dielectric flux concentration due to the non-homogeneous character of the porcelain, and mechanical stresses due to differences in coefficients of expansion of the constituents of the porcelain itself. He called attention to the fact that deterioration may take place independently of electrical stresses, quoting an example from the Pacific Coast where the percentage of deterioration in a lot of several hundred insulators, left over from line construction and remaining in the original crates, was practically the same as that occurring in the ones in service. The crates were of the usual open type and had been stored in a yard for a period of approximately four years.

In Mr. Peaslee's opinion the porcelain insulator as commercially available to-day is not a success in that it is deteriorating too rapidly both in and out of use. To overcome the defects there must be a correct appreciation of the mechanism of breakdown and the application of direct principles of electric flux distribution. He finds that quartz has many advantages for insulator manufacture, and he is experimenting to eliminate the difficulties in the way of making satisfactory commercial quartz insulators.

In another paper in which present practice in the design and manufacture of high-tension insulators was described by A. O. Austin, chief engineer Ohio Insulator Company, the statement was made that under the conditions of development of the high-tension insulator it is surprising that it has reached the present state of perfection. However, the very nature of the dielectric, the necessarily low cost due to the large number of insulators required, and the many hazards to which insulators are subjected in operation give us no right to expect that a line can be equipped with insulators which have absolutely no depreciation.

The cracking of insulators is by far the most serious cause of depreciation on most lines. Examination of many insulators which have cracked on the line indicates that the largest and apparently strongest insulators crack soonest, and also that the size, shape and number of the cemented joints affect the cracking. Much effort has been expended to incorporate in the modern type insulator a few strong parts, small heads with corresponding cement sections and areas, minimum amount of nesting permissible with mechanical reliability and elasticity in the joints. The last-named item was considered by Mr. Austin to be of great importance, and he stated as the requirements for a satisfactory insulator joint that there must be a minimum area for a given grip, an absence of slipping, and an elastic yield or ability to distribute a heavy load. A coated sanded surface fulfills these requirements to a marked degree. In conclusion, he insisted, among other things, that the abnormally low depreciation and successful performance of well-insulated lines under the severest conditions show that the modern insulator is very successful compared to the earlier products. For old lines it is well to consider the hazard increasing with time due to an increasing rate of depreciation. To maintain a given standard of performance it is then necessary either to split up the system into smaller sections as the line becomes older or to go over the line at decreasing intervals of time to remove the faulty material.

### Discussion on Insulators

Comment on the above papers brought out a number of practical points from the operator's standpoint. For example, it was shown that while a broken unit in a multiple-part insulator may not ruin it electrically it may do so mechanically, hence cracking is a doubly serious matter. Another point was that while seasonal changes have a tendency to cause deterioration in cap and stud units this need not result especially with newer units. There was some debate as to the merits of two-part versus three-part insulators, it being held that while the relative effect of the loss of one part is greater with the former than the latter, to offset this there is greater reliability throughout in the insulator with fewer parts. There was general agreement on the desirability of weeding out weak insulators in securing economical maintenance. In reference to the proposed quartz insulator, one speaker said that, while quartz will withstand heavy arcing and will not crack under sudden cooling from water, it may become brittle at 150 to 200 deg. Fahr.

### High-Tension Cable Problems

In the opinion of John L. Harper, chief engineer, Hydraulic Power Company, Niagara Falls, N. Y., as expressed in a paper, the present abnormally high cost of underground cables renders it unusually necessary for operating engineers to devise ways and means for working present cable installations to a capacity much greater than they were supposed to have. From his paper one may infer that he thinks it is to be done through having full knowledge of the causes of cable failures. These failures he attributes to poor joints, mechanical abrasion and overheating. The joints may be poor due to improper workmanship or to the use of a joint-filling compound that has not the same characteristics as the insulating compound used in the cable itself. Experience and practice are necessary to insure well-made joints, and manufacturers can supply suitable joint-filling compounds if requested. There seems to be no cure for the evils of mechanical abrasion of lead sheath except to let nature take its course.

In order to increase the capacity of cables without overheating, Mr. Harper suggests, for new and permanent construction, provision for dissipating heat by water, if possible so constructing conduit systems that the ducts can be flooded and cables operated under practically submarine conditions. By this means the carrying capacities of underground cables could be made nearly to approach those of bare aerial conductors.

On the same general subject as that covered by Mr. Harper were the specifications for making cable joints for voltages from 10,000 and upward as presented by D. W. Roper, superintendent of street department, Commonwealth Edison Company, Chicago, Ill. He recommended in particular the following points: Liberal cutting back of the sheath to prevent injury to the insulation during the making of the joint. The use of copper splicing sleeves of liberal cross-sectional area, at least equal to that of the conductor, and of a length about four times the diameter of the conductors. The elimination of sharp points and edges in the splicing sleeve. The use of solid insulation to hold the conductors in fixed positions, and of filling compound of suitable dielectric strength not materially affected at the maximum operating temperature; this compound to be non-hygroscopic, free from tendency to form cracks in cooling or in cold weather, sufficiently fluid to flow into all air spaces before becoming chilled, and capable of removal without injury to insulation, and not having an excessive coefficient of expansion. Application of insulation and compound in such a way as to prevent the formation of air pockets or voids. Careful exclusion of all moisture. The use of care to prevent compound from running back into cable at high temperature if compound with low-melting point is used. Suitable identification of the joint as to the workman making it. Safeguarding the joint from mechanical injury.

The results of some tests on dielectric losses in high-tension cables were given by two testing engineers, A. F. Bang and H. D. Louis, who are connected with electric power companies. They studied the losses in several samples of cable installed in a special testing conduit and subjected to temperature from normal up to very high values. They showed how, by plotting curves, between watts loss per foot and temperature, representing both the heat-dissipating capacity of the conduit and the dielectric losses in the cable, it is possible to calculate the allowable copper loss and hence the operating capacity of the cable.

W. S. Clark and G. B. Shanklin, of the General Electric Company, Schenectady, N. Y., gave the results of elaborate tests on insulation characteristics of high-voltage cables, directing attention to the fact that practically all failures on such cables can be attributed to heating. This heating occurs at certain "hot spots," which particularly are effective in limiting the allowable current in the cable because of the rapid rise of dielectric loss with temperature and its cumulative tendency at high temperature. The tests made by Messrs. Bang and Shanklin yielded a vast collection of data which are available to cable experts.

Naturally a salient point in the discussion on cables was that raised by the suggestion of artificial cooling. The objections to flooding ducts were that the manholes must be pumped out for making repairs, there is increased danger of electrolysis, and water containing much air is apt to cause rapid oxidation. The intelligent forcing of cables was recommended although attention was also directed to the fact that some cable trouble is caused by use under conditions not originally contemplated. Another point emphasized by one of the speakers was the importance of radiation from the ducts which should be so constructed as not to impede radiation.

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# Fare Increases Already Granted

## Sixty-Seven Companies Have Obtained Permission to Raise Rates Since 1914—Massachusetts, Where Capitalization Has Long Been Under State Control, Leads in Important Cases—Municipal Lines Are Included

THE bureau of information of the American Electric Railway Association has prepared a list of electric railways which have obtained fare increases of some sort since the year 1914. Twenty-one States and the Dominion of Canada are represented. In all, sixty-seven cases are cited in which fares have actually been raised. The bureau has endeavored to include all increases up to June 1, 1917.

An interesting feature of the list is the fact that more important fare increases have been granted in Massachusetts than in any other division in the list. This is an effective answer to those who claim that the necessity for increased revenue arises largely from overcapitalization, since in Massachusetts the issuance of securities by public utilities has been under the supervision of the State authorities for more than thirty years. Hence in this State, at least, there is very little complaint of watered stock.

It will be noticed that the Canadian list includes three municipally owned lines, which seem to have no better means of escaping consequences of increased costs of production than the privately owned enterprises.

The list as compiled by the association, showing the references from the ELECTRIC RAILWAY JOURNAL, follows:

### ARKANSAS

**Fort Smith Light & Traction Company, Fort Smith, Ark.:**

OCTOBER, 1915—The company announced discontinuance of practice of selling twenty-five tickets for $1. (E. R. J., Vol. 46, 931.)

### CALIFORNIA

**Glendale & Eagle Rock Railway, Glendale, Cal.:**

MARCH, 1914—Application made for permission to discontinue sale of twenty-ride commutation tickets at 50 cents and to substitute in lieu a regular fare of 5 cents. (E. R. J., Vol. 43, 611.)

MAY, 1914—Application granted by California Railroad Commission (order not applicable to children under eighteen years of age). (E. R. J., Vol. 43, 1012.)

**Los Angeles (Cal.) Railway:**

APRIL, 1915—District Court of Appeals upheld the right of the company to charge 10-cent fares from city to Eagle Rock, etc. (E. R. J., Vol. 45, 777.)

**San Diego & Southeastern Railway, San Diego, Cal.:**

JANUARY, 1916—Application of company for an increase in freight and passenger rates approved by California Railroad Commission. One-way fare between Third Street and city limits to remain 5 cents. (E. R. J., Vol. 47, 104.)

**San Francisco, Napa & Calistoga Railway, Napa, Cal.:**

MAY, 1917—Authorized by California Railroad Commission to increase monthly commutation rate between Napa and Vallejo from $5 to $6. (E. R. J., Vol. 49, 937.)

### CONNECTICUT

**Bridgeport & Danbury Electric Railway, Bridgeport, Conn.:**

OCTOBER, 1916—Announcement that company operating a line between Bridgeport and Longhill will hereafter constitute its line into two fare-zones in each of which the fare will be 6 cents. (*Municipal Journal*, Sept. 21, 1916.)

**Groton & Stonington Street Railway, Norwich, Conn.:**

MARCH, 1917—Copper-zone system (2-cent zones instead of 5-cent) held as not unreasonable by Public Utilities Commission. (E. R. J., Vol. 47, 582, 1062 and 1089; Vol. 49, 618.)

### GEORGIA

**Augusta-Aiken Railway & Electric Company, Augusta, Ga.:**

JANUARY, 1914—Petition asking for an increase in rates on lines in South Carolina from 1 cent to 2 cents per mile allowed by South Carolina Railroad Commission. Increase to go into effect June 1, 1915. (E. R. J., Vol. 44, 985, 1121, 1222; Vol. 45, 77, 118, 159, 1050; Vol. 46, 423.)

### IDAHO

**Idaho Traction Company, Boise, Idaho:**

AUGUST, 1915—The company filed a schedule of rates with the Public Utilities Commission calling for increases in mileage rates. This was partially allowed by the commission, the company not to charge more than 5 cents within city limits. (E. R. J., Vol. 46, 128; Vol. 47, 801.)

### ILLINOIS

**Lincoln Railway & Heating Company, Lincoln, Ill.:**

NOVEMBER, 1915—Company discontinued sale of six tickets for 25 cents. (E. R. J., Vol. 46, 1145.)

### INDIANA

**Fort Wayne & Northern Indiana Traction Company, Fort Wayne, Ind.:**

OCTOBER, 1915—Application for permission to revise interurban passenger fares to 2 cents per mile, etc., granted. (Public Utility Reports, 1915 B, 1094.)

**Indianapolis, Columbus & Southern Traction Company, Columbus, Ind.:**

NOVEMBER, 1915—Increase from 1¾ cents to 2 cents per mile announced. (E. R. J., Vol. 46, 1145.)

**Gary & Interurban Railroad, Gary, Ind.:**

JULY, 1916—Public Service Commission permitted discontinuance of practice of selling fifty-four tickets for $2.15 (1¼ cents per mile), this being considered too low. (E. R. J., Vol. 48, 39.)

**Union Traction Company of Indiana, Anderson, Ind.:**

APRIL, 1916—Increases in fares through substitution of copper-zone system (2 cents per mile) for low fares in franchise allowed by Public Service Commission. The increase will in some instances amount to more than 100 per cent. Former rates were declared discriminatory. (E. R. J., Vol. 47, 799.)

## MAINE

**Atlantic Shore Electric Railway, Sanford, Me.:**

January, 1915—Filed new passenger tariff calling for cancellation of all reduced rates now in force and certain other increases in fares. (E. R. J., Vol. 45, 159.)

## MARYLAND

**Cumberland & Westernport Electric Railway, Cumberland, Md.:**

February, 1915—Increased price of 100-ticket books from $4 to $4.50. (E. R. J., Vol. 45, 355.)

## MASSACHUSETTS

**Middlesex & Boston Street Railway, Newtonville, Mass.:**

July, 1914—Notice filed with Public Service Commission of a proposed increase in rate of fare effective Aug. 3, 1914, from 5 cents to 6 cents for every ride between any two fare limits, with an additional charge of 1 cent for every transfer issued. (E. R. J., Vol. 44, 146.)

August, 1914—Proposed increase in rate of fare suspended by commission until Oct. 1, 1914. (E. R. J., Vol. 44, 278.)

November, 1914—Case appealed to Massachusetts Supreme Court. (E. R. J., Vol. 44, 1180. See also Vol. 44, 543, 591 and 792.)

**Providence & Fall River Street Railway, Swansea Center, Mass.:**

January, 1914—Public Service Commission notified of proposed increase in rates for local passengers from 5 cents to 6 cents per passenger per fare zone, effective Feb. 1, 1914. The increase was approved by the commission. (E. R. J., Vol. 44, 209 and 692.)

**Blue Hill Street Railway, Canton, Mass.:**

July, 1915—Public Service Commission granted increase in fares from 6 cents to 8 cents or seven tickets for 50 cents. (E. R. J., Vol. 46, 226.)

**New Bedford & Onset Railway, New Bedford, Mass.:**

September, 1915—Public Service Commission granted an increase in fares from 5 cents to 6 cents for each existing fare limit and reduced rate tickets from twenty-four for $1 to twenty for $1. (E. R. J., Vol. 45, 819, 863, 959 and 1136; Vol. 46, 628.)

**Norfolk & Bristol Street Railway, Foxboro, Mass.:**

February, 1915—Six-cent unit fare granted by Public Service Commission. (E. R. J., Vol. 45, 1136; Vol. 46, 354.)

**Bristol & Norfolk Street Railway, Randolph, Mass.:**

April, 1916—Petitioned Public Service Commission for permission to increase fare from 5 cents to 6 cents. (E. R. J., Vol. 47, 716.)

October, 1916—Permission granted. In this case a street railway operated at a loss was authorized to increase the cash fare from 5 cents to 6 cents; to sell ten school tickets for 30 cents to pupils entitled to half fare, rather than ten tickets for 25 cents; and to discontinue the practice of charging half fare between the hours of 6 a.m. and 8 a.m. and 4.30 p.m. and 6.30 p.m. (E. R. J., Vol. 47, 841; Vol. 48, 469 and 553.)

**Bay State Street Railway, Fall River, Mass.:**

March, 1916—Withdrawal from sale of strips of six tickets for 25 cents in the city of Fall River approved by Massachusetts Public Service Commission. (E. R. J., Vol. 48, 1179; Vol. 49, 56 and 457.)

**Bay State Street Railway, Boston, Mass.:**

October, 1916—Public Service Commission, having been notified of intention to establish a 6-cent fare unit on all of the company's lines, denied the increase, but did allow increases on rural lines. (E. R. J., Vol. 47, 468; Vol. 48, 412, 444 and 514.)

**Concord, Maynard & Hudson Street Railway, Maynard, Mass.:**

April, 1917—Authorized by the Public Service Commission to establish a copper-zone system of fares with a minimum fare of 6 cents and a rate of 2 cents per mile to be charged in excess. Present fare on the main line is 6 cents, with zones from 3 to 4 miles in length. Under new system road will be divided into 1-mile zones. (E. R. J., Vol. 49, 846.)

**Massachusetts Northeastern Street Railway, Haverhill, Mass.:**

October, 1916—Proposed increase from a 5-cent unit zone fare to a 6-cent unit, together with proportionate increases in the charge for school children's and workmen's tickets, allowed by Massachusetts commission in part. (E. R. J., Vol. 46, 1145; Vol. 48, 951 and 1038.)

**Norwood, Canton & Sharon Street Railway, Canton, Mass.:**

April, 1917—Public Service Commission permitted company to increase fare from 5 to 7 cents, and authorized it to sell ten tickets for 65 cents and sixteen for $1. School tickets to be sold at ten for 35 cents instead of ten for 25 cents. (E. R. J., Vol. 48, 1081; Vol. 49, 322 and 893.)

**Ware & Brookfield Street Railway, Ware, Mass.:**

March, 1917—Fare increases amounting to a maximum of 3 cents above an existing 7-cent rate allowed by the Public Service Commission. Changes in rates requested included the shortening of a fare zone between Ware and Gilbertville, establishment of a 7-cent cash fare for every local ride within the limits of every fare zone except one, regular cash fare between above points to be 10 cents instead of 7 cents, increase of workmen's fares from 5 cents to 7 cents between above points and establishment of a 12-cent workmen's fare from Ware to West Brookfield or intermediate points in place of the former rate of 10 cents. (E. R. J., Vol. 49, 665.)

**Worcester & Warren Street Railway, West Warren, Mass.:**

April, 1917—The Public Service Commission was petitioned for authority to increase the passenger fare unit from 6 to 7 cents between West Warren to Spencer, the 6-cent unit having been in force ten years. The 7-cent unit was authorized. Workmen's tickets valid week days, 5 to 7, morning and afternoon, to be sold 50 for $3 (formerly 100 for $5). Age limit for children carried free reduced from 6 years to 5 years. Extra fare to be charged for every package carried on platform. (E. R. J., Vol. 49, 185, 411 and 711.)

## MISSOURI

**Illinois Traction System, St. Louis, Mo.:**

January, 1915—Application to be made to Public Service Commission and Interstate Commerce Commission for permission to increase fare from 5 cents to 10 cents between St. Louis and Granite City, Ill. The franchise provided for 5-cent fare. (E. R. J., Vol. 45, 159; Vol. 47, 475, 840, 881 and 1207; Vol. 48, 995.)

December, 1916—Increase allowed by Interstate Commerce Commission. (E. R. J., Vol. 48, 1222 and 1269.)

## NEW HAMPSHIRE

**Manchester & Derry Street Railway, Manchester, N. H.:**

October, 1916—Increase from 5-cent to 8-cent unit fare allowed by Public Service Commission. (E. R. J., Vol. 46, 1059; Vol. 48, 952.)

**Manchester & Nashua Street Railway, Manchester, N. H.:**

October, 1916—Increase in fare unit from 5 cents to 7 cents authorized by Public Service Commission—retention of school children's fares and commutation tickets on a 5-cent basis recommended. (E. R. J., Vol. 46, 1059; Vol. 48, 851.)

**Massachusetts Northeastern Street Railway, Haverhill, Mass.:**

See under Massachusetts. Petition similarly approved in part by New Hampshire commission for company's lines in that State. (E. R. J., Vol. 48, 1038.)

## NEW JERSEY

**Burlington County Transit Company, Mount Holly, N. J.:**

March, 1916—Petition to increase fare between Moorestown and Mount Holly and Mount Holly to Burlington from 10 cents to 15 cents presented to Public Utilities Commission. (E. R. J., Vol. 47, 477; Vol. 48, 81 and 912.)

November, 1916—Increases allowed on condition that improvements be made. (E. R. J., Vol. 48, 1223.)

**New Jersey & Pennsylvania Traction Company, Trenton, N. J.:**

June, 1916—Increase in fare (10 to 15 cents) between Princeton and Trenton ordered after valuation by Board of Public Utilities Commissioners (zone fare). Upon appeal being taken to New Jersey Court of Errors and Appeals, commission's jurisdiction and order was upheld.

October, 1916—The application to Board of Public Utilities Commissioners for permission to increase rate between Trenton and Philadelphia from 15 cents to 20 cents, denied in April, 1915, was allowed, tickets to be still sold at twelve for $1—four 5-cent zones created. (E. R. J., Vol. 45, 819; Vol. 46, 1279; Vol. 48, 911.)

## NEW YORK

**Schenectady (N. Y.) Railway:**

MAY, 1914—The complaint of city of Schenectady, asking that company be required to resume sale of six tickets for 25 cents, dismissed by Public Service Commission. (E. R. J., Vol. 43, 1232.)

**Hudson Valley Railway, Glens Falls, N. Y.:**

DECEMBER, 1914—Tariff increasing fares, effective Jan. 1, 1915, filed with Public Service Commission. (E. R. J., Vol. 44, 1368.)

**International Railway, Buffalo, N. Y.:**

AUGUST, 1914—Notice of a proposed increase in fare between North Tonawanda and La Salle from 10 cents to 15 cents (effective Sept. 15, 1914), filed with Public Service Commission. (E. R. J., Vol. 44, 407.)

**New York State Railways, Rochester, N. Y.:**

OCTOBER, 1914—Increases in suburban fare sustained by Public Service Commission in part. (E. R. J., Vol. 44, 791 and 1274.)

**New York State Railways, Syracuse, N. Y.:**

NOVEMBER, 1914—Tariff filed with Public Service Commission (effective Dec. 15, 1914), providing for increase in joint one-way fares from a number of points. (E. R. J., Vol. 44, 1222.)

**Buffalo & Lake Erie Traction Company, Buffalo, N. Y.:**

JANUARY, 1915—Announced increase in local one-way fare between Irving and Silver Creek from 7 cents to 10 cents, effective Jan. 24, 1915. (E. R. J., Vol. 45, 119.)

**Fonda, Johnstown & Gloversville, Gloversville, N. Y.:**

FEBRUARY, 1915—Tariff filed with Public Service Commission, effective Feb. 1, 1915, calling for a general advance in fares. (E. R. J., Vol. 45, 159.)

**International Railway, Buffalo, N. Y.:**

FEBRUARY, 1915—Notice of proposed increase in round-trip fare between Buffalo and Lockport from 50 cents to 60 cents and other changes filed with Public Service Commission. (E. R. J., Vol. 45, 441.)

**Newark & Marion Railway, Newark, N. Y.:**

FEBRUARY, 1915—Tariff filed with Public Service Commission, effective March 17, 1915, increasing cash and ticket fares. (E. R. J., Vol. 45, 441.)

**New York State Railways, Oneida, N. Y.:**

APRIL, 1915—Tariff filed with Public Service Commission calling for advances in local one-way and round-trip ticket fares and chartered car rates effective May 14, 1915, on Oneida and adjacent lines. (E. R. J., Vol. 45, 819.)

**Orange County Traction Company, Newburgh, N. Y.:**

APRIL, 1915—Announcement of an increase in fares (local one-way) between Newburgh and Orange Lake Park or between Walden and Orange Lake Park from 5 cents to 10 cents, between the hours of 2 p.m. and 12 o'clock midnight. (E. R. J., Vol. 45, 777.)

**Geneva, Seneca Falls & Auburn Railroad, Seneca Falls, N. Y.:**

APRIL, 1917—Public Service Commission permits company to place into effect a new passenger tariff adding a 5-cent fare zone between Geneva and Waterloo. Twenty-ticket commutation books will continue to be sold for $2, good during morning and evening rush hours. Twenty-ride ticket books, good at any time, will be sold for $2.50. (E. R. J., Vol. 49, 665.)

**United Traction Company, Albany, N. Y.:**

MARCH, 1917—Following denial by Public Service Commission of an increase in fares from 10 cents to 15 cents (with full transfers) between Albany and Troy, the company filed a fare tariff for this line providing for the elimination of transfers to city lines in the terminal cities. This was allowed by the commission. (E. R. J., Vol. 48, 1040 and 1319; Vol. 49, 412, 667 and 713.)

## OHIO

**Cleveland (Ohio) Railway:**

AUGUST, 1914—Charge of 1 cent for transfers restored. (E. R. J., Vol. 44, 404.)

**Mahoning & Shenango Railway & Light Company, Youngstown, Ohio:**

Increase in fares announced to go into effect on Dec. 15, 1914—2 cents per mile the basis for increase—commutation and school tickets to remain unchanged. (E. R. J., Vol. 44, 1274.)

**Toledo Railway & Light Company, Toledo, Ohio:**

APRIL, 1916—Company allowed by Judge Killits of United States District Court to eliminate 3-cent fare during rush hours, morning and evening, and to substitute and charge at all hours 5 cents cash or six tickets for 25 cents. (E. R. J., Vol. 47, 745 and 833.)

## OREGON

**United Railways, Portland, Ore.:**

OCTOBER, 1914—Application to increase fares to Linton granted by Oregon Railroad Commission. (E. R. J., Vol. 43, 799 and 1119; Vol. 44, 501.)

## PENNSYLVANIA

**Titusville (Pa.) Traction Company:**

DECEMBER, 1916—The Titusville Traction Company allowed an increase in fares from 5 cents to 6 cents in the city of Titusville, in the boroughs of Pleasantville and Hydetown and in the township of Oil Creek. (E. R. J., Vol. 48, 1178.)

**Trenton, Bristol & Philadelphia Street Railway, Philadelphia, Pa.:**

JANUARY, 1917—New schedule of fares in effect between Morrisville and Torresdale, Pa. The through trip fare between these two towns increased from 25 cents to 35 cents. (E. R. J., Vol. 49, 56.)

## VERMONT

**Barre & Montpelier Traction & Power Company, Montpelier, Vt.:**

AUGUST, 1914—Proposed increase in fares held up by equity suit brought by the city—from 5 cents to 6 cents and workmen's tickets from 2½ cents to 3½ cents. (E. R. J., Vol. 44, 235 and 368.)

NOVEMBER, 1914—Increase enjoined by Vermont Supreme Court because of franchise restrictions. (E. R. J., Vol. 44, 1121.)

DECEMBER, 1914—Tariff increasing fare over line between cities from 10 cents to 15 cents filed with Public Service Commission. (E. R. J., Vol. 44, 1319.)

Increase in fare between Barre and Montpelier to 15 cents one way and 25 cents round trip, went into effect Dec. 28, 1914. For the previous eight years the fare had been 10 cents. (E. R. J., Vol. 45, 119.)

## WASHINGTON

**Puget Sound Electric Railway, Seattle, Wash.:**

APRIL, 1914—Renewed application for an increase in passenger rates between Seattle and Tacoma, made in 1909, as follows: 2 cents per mile; commutation, 1.4 cents per mile; round trip from Seattle to Tacoma, $1.25; at which time the State Railroad Commission refused permission. (E. R. J., Vol. 43, 949.)

MAY, 1914—Allowed by Public Service Commission, which vacated the order of the State Railroad Commission which it succeeded, made in April, 1910. (E. R. J., Vol. 43, 1059, 1174, 1304 and 1420; Vol. 44, 234.)

**Tacoma Railway & Power Company, Tacoma, Wash.:**

JUNE, 1916—Increase in round-trip fare between Tacoma and American Lake from 25 cents to 30 cents upheld by Public Service Commission as not unjust or excessive. (E. R. J., Vol. 47, 1111.)

## WEST VIRGINIA

**Parkersburg-Marietta Interurban Railway, Parkersburg, W. Va.:**

JULY, 1914—Allowed by Public Service Commission to increase rates between Parkersburg and Marietta from 10 cents to 20 cents by creating four traffic zones. Company required, however, to issue commutation tickets equivalent to a 5-cent fare for 6½ miles from Parkersburg. (E. R. J., Vol. 44, 235.)

## WISCONSIN

**Chicago & Milwaukee Electric Railway, Milwaukee, Wis.:**

FEBRUARY, 1916—Authorized in April, 1915, by Wisconsin Railroad Commission and the Interstate Commerce Commission to increase ticket rates to approximately 2 cents per mile, but to maintain 5-cent zone system of cash fares. No change in 5-cent Milwaukee city fare, but ticket rates between Milwaukee City limits and Wisconsin State line on a straight 2 cents per mile basis. Cash fares collected on trains also, but collections to be made in next higher multiple of 5 cents. One-hundred coupon books for $1 to be sold by mail. Minimum fare to be 5 cents. Old average fare was about 1.8 cents per mile. (E. R. J., Vol. 47, 383.)

**Duluth-Superior Traction Company, Superior, Wis.:**

APRIL, 1916—Wisconsin Railroad Commission issued order rescinding order made Nov. 13, 1912, reducing fares by requiring sale of six tickets for 25 cents. Cash fare was always 5 cents. (E. R. J., Vol. 40, 1067; Vol. 47, 840.)

**Waupaca Electric Light & Railway Company, Waupaca, Wis.:**

MARCH, 1916—Increase from 10 cents to 15 cents between Soo Line Depot and Grand View Hotel, through establishment of three instead of two zones, denied; however, a 12½-ticket rate was allowed by Wisconsin Railroad Commission. (E. R. J., Vol. 47, 627.)

### CANADA

**Port Arthur & Fort William Electric Railway, Port Arthur, Ont.:**

SEPTEMBER, 1914—Advisability of increasing ticket rate on municipal street railway system from six for 25 cents to 5 cents straight was considered (no interference with children's or workmen's tickets proposed), the city council finally approving. (E. R. J., Vol. 44, 592.)

**Saskatoon (Sask.) Municipal Railway:**

AUGUST, 1914—City Council of Saskatoon passed a resolution increasing fares from six for 25 cents to straight 5 cents. Workmen's tickets to be sold as before at eight for 25 cents for use between 6 a.m. and 8 p.m., and school children to be carried at half fare to and from school. (E. R. J., Vol. 44, 185.)

**British Columbia Electric Railway, Vancouver, B. C.:**

MAY, 1915—Fares reduced to stimulate travel and fight jitney competition, eight tickets sold for 25 cents, no transfers. (E. R. J., Vol. 45, 959.)

MARCH, 1916—Selling of eight tickets for 25 cents discontinued. (E. R. J., Vol. 47, 512.)

**Kingston, Portmouth & Cataraqui Electric Railway, Kingston, Ont.:**

JUNE, 1916—On June 1 the company discontinued selling six tickets for 25 cents and substituted a cash fare of 5 cents. Workmen's tickets, good from 6.30 to 7.59 a.m. and from 5 to 6.30 p.m., are sold at eight for 25 cents, and tickets for children between the ages of five and twelve are also sold at eight for 25 cents. (*Canadian Railway & Marine World*, July, 1916.)

**Port Arthur (Ont.) Civic Railway:**

**Fort William (Ont.) Electric Railway:**

MARCH, 1917—Utilities Commissions of both cities adopted a new schedule of fares for Port Arthur Civic Railway, providing for one fare in each city or two fare zones; 5-cent cash, six tickets for 25 cents from 5 a.m. until 12 p.m.; workmen's eight tickets for 25 cents good during certain morning and evening hours and Sunday tickets at the same rate, good from 5.30 a.m. until 12 p.m. Children under fourteen years of age allowed ten tickets for 25 cents; students at this rate between 8 a.m. and 5 p.m. on school days. A 10-cent fare to be charged from 12 p.m. to 5.30 a.m., good for a through ride. (E. R. J., Vol. 49, 711.)

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In addition to the cases in which increased rates have already been granted in whole or in part, applications for increases have been filed by various companies. Exclusive of those for lines in New York State, many of which are now acting in concert, the cases now before the authorities for disposition are:

**Illinois Traction System, Peoria, Ill.**
**Hagerstown & Frederick Railroad, Frederick, Md.**
**United Railways & Electric Company, Baltimore, Md.**
**Bay State Street Railway, Boston, Mass.**
**Kansas City (Mo.) Railways.**
**Lincoln (Neb.) Traction Company.**
**Bucks County Interurban Railway, Trenton, N. J.**
**Trenton & Mercer County Traction Company, Trenton, N. J.**
**Portland Railway, Light & Power Company, Portland, Ore.**
**Montoursville (Pa.) Passenger Railway.**
**Pittsburgh (Pa.) Railways.**
**Milwaukee Electric Railway & Light Company, Milwaukee, Wis.**

## COMMUNICATION

## A Publicity Bureau for the Association

SOUTHERN PUBLIC UTILITIES COMPANY
CHARLOTTE, N. C., July 2, 1917.

To the Editors:

From a letter written by the editor of the ELECTRIC RAILWAY JOURNAL, received about the middle of June, I obtained the impression that in an early issue of the JOURNAL would appear some comments concerning the suggested publicity bureau for the electric railway interests of the United States, with especial reference to a conference of a number of publicity men at St. Louis early in June.

The St. Louis conference resulted in several things, the most important being the decision of those present to send the entire matter back to the American Electric Railway Association, where it rightly belongs, with some concrete suggestions as to the nature and purpose of such a bureau.

A committee composed of Mr. Brumbee of the United Railways of St. Louis, Mr. Waugh of the Interborough and the New York Railways, Mr. Burroughs of the United Railways of Baltimore, Mr. Davidson of the Denver Tramway and the writer was appointed, to prepare suggestions for interchange between the membership of the committee and the submission of the composite suggestions of the whole committee to the executive committee of the American Electric Railway Association, for consideration either at the mid-winter session or for the next annual convention of the association.

At the conference the nature of such a bureau was discussed at length, during which it was found that a wide variance of opinions existed among the publicity men taking part in the Round Table.

That a central editing office combined with a central publication office is not practical is the opinion of the writer, expressed as emphatically as is possible at the annual convention at Atlantic City in October, 1916. In this opinion I believe publicity men engaged in active electric railway service will concur.

For instance, following the Atlantic City convention, my office and that of the president of my company were flooded with offers from printing companies in many sections of the country to publish a bulletin or magazine for all electric railway companies. Their plan, in every instance, was to compile, at the central or publishing city, data of a general nature applying to all electric railways, to compose a large percentage of the publication, the various companies to furnish a small percentage of the data relating specifically to local conditions and happenings, and the publication to carry a different cover design for each company but to issue from one central office.

The scheme is all right in theory but in practice it falls down. General Hancock said several years ago that the tariff is a local issue, and electric railway publicity is a local matter, purely and simply. Conditions which prevail at Denver do not prevail at Charlotte. And publicity which is all it should be for the Brooklyn Rapid Transit would seriously affect the United Railways of St. Louis in all probability.

Hence the publication of a general bulletin to cover the entire business would be dangerous, in the first place, and it is my opinion that such a publication would fail of support at the hands of the employees of any of the interested companies.

And again, such a plan of handling the publicity of electric railway companies would entail endless complications and take from the individual company the control of the publication, to a great extent, if not entirely.

I am of the opinion that a bureau within the American Electric Railway Association, whether as a department of the Transportation & Traffic section, or as a new section, either alone or in conjunction with the public relations committee, could and would serve the proper ends. As an information bureau for companies not operating a department of publicity, it would be of immense value. There is not a week in which I do not receive requests from other companies for information concerning operating methods. Requests for cost data, circulation plans, policies and the like come in all through the year. I am glad, always, to give this information, and doubtless every other publicity man feels the same way. But the company desiring this information must needs analyze the information received from many sources, spend considerable time in securing it and possibly miss the company having very nearly the same conditions under which to operate.

My suggestion would be to have periodical reports made to the secretary of the bureau, similar to the fare research work now under way, and which is proving of so much value to the business. All information, of whatsoever character, would be included in these reports, and when any company desired information concerning publicity the secretary could furnish immediately detailed reports, confidentially, if need be, from every company operating a publicity department.

So much for the company contemplating or considering the establishment of such a department.

But the greatest value would be to the companies already operating such a department. For instance, should I desire information concerning the operation of any given line of publicity the secretary could give me, without loss of time, the experience of every company of the association, at an expense that would be inconsiderable.

Advice concerning the advisability of publishing certain information would come from the bureau, having in hand information concerning the experience of all the railways.

Advice as to how to secure desired matter for publication and the actual preparation, in isolated cases, of articles for individual companies or for the business at large would, under my plan, come from this bureau.

I am opposed now, and always have been, to the organization of a bureau of electric railway publicity men aside and separate from the American Electric Railway Association. I am on record in the office of the secretary of the A. E. R. A. as being opposed to the conference of publicity men at St. Louis in June, unless it were approved by the executive committee of the association and were in line with the desires of the officers. I thought the conference would accomplish good results as a round table discussion of the difficulties publicity men meet in their work, but if the meeting contemplated, as I understand it did, the organization of a department of the Associated Advertising Clubs of the World, or of a separate bureau or association, outside the A. E. R. A., I was opposed to the entire proceedings. And the action of the publishers at the St. Louis conference, in deciding to offer suggestions to the association for the organization of such a bureau within the association, is directly in line with the opinion of leaders in the publicity field, including Ivy L. Lee, James H. McGraw, A. D. B. Van Zant and others at the Atlantic City convention in 1916.

Since the St. Louis conference I have not heard from the other members of the committee appointed to prepare suggestions for interchange, but within the coming month I shall have my suggestions in shape, covering in more detail the general ideas presented herein, for the other members of the committee, and I am trusting that within that time the entire committee will have its suggestion in the hands of each other, so that we can then begin the formulation of the concrete suggestion to the executive committee for its consideration at the mid-winter meeting.

LEAKE CARRAWAY, Director of Publicity.

## Trial Six-Cent Fare for Bay State

### New Fare Unit Becomes Effective on July 13 for Six Months' Trial—Sale of Twenty Tickets for One Dollar Approved—No Transfer Charge

THE Massachusetts Public Service Commission on July 3 granted the Bay State Street Railway, Boston, Mass., permission to establish a 6-cent fare unit on its entire system for a six months' trial period. This decision followed an agreement between the company and a number of the larger municipalities served, as outlined in the issue of the ELECTRIC RAILWAY JOURNAL for June 30.

### WHAT THE COMPANY DESIRED

The company appealed on May 16 for increased rates on the ground that the cost of operation had increased so rapidly since the decision of Aug. 31, 1916, that the revenue had become entirely inadequate. On June 12 the company filed a schedule of fare changes. Under this it was proposed to make the unit cash fare 6 cents upon all lines; to sell nine transferable tickets for 50 cents good except on Saturday afternoons, Sundays and holidays, in the present 5-cent zones within, from or to the centers of seventeen cities, and to charge 1 cent for each transfer issued; to abolish certain commutation, excursion and special tickets, including the 8-cent check between the company and the Boston Elevated Railway; and to increase the rates for workmen's tickets to 80 per cent of the cash fare where they cover two zones, and to 66 2/3 per cent of the cash fare where they cover three zones. At a hearing on June 21 the company introduced evidence that it required $1,404,906 additional yearly revenue, and computed that the proposed change would yield a yearly increase of $1,111,700.

### MODIFICATIONS MADE IN FARE PROPOSAL

There was much opposition to the schedule proposed. As the result of conferences between the company and the municipalities concerned, the company amended its plan to provide for the sale of twenty tickets for $1, such tickets to be good except on Saturdays after 1 p. m., Sundays and holidays, within the seventeen cities, between such of those cities as are adjoining, and between such cities and adjoining towns or portions of towns as by reason of location or density of population are practically part of such cities. The proposed charge of 1 cent per transfer was eliminated, but provision was made for the adjustment of transfer privileges outside this territory by restricting the length of ride to that reasonably furnished for a single fare. The proposed increases in workmen's tickets and the cancellation of commutation and other special tickets were also eliminated, although the company might later file a separate schedule. It was also understood that any patrons within the present 5-cent territory who would be excluded from the use of the twenty-ride tickets would have the right of appeal without prejudice, and a like plan was agreed upon with respect to transfers. The company would keep a detailed record of a six-months' trial, after which, upon application to the commission, the entire case should be reopened.

As a result of these modifications the company estimates that the annual increase in operating revenue will be reduced from $1,111,700 to $720,000. The commission does not consider this estimate unduly low. It is satisfied that the results from operation, at least during the experimental period, will not make possible an excessive return upon the investment. In regard to the sale of tickets (the municipalities urged the sale of ten tickets for 50 cents or five for 25 cents), the commission holds it not unreasonable to require an investment of $1. It takes this stand because the large majority of present schedules for workmen's and other special tickets provide for an investment of $1 or more; because an investment of a like or a larger amount is commonly required for similar tickets issued by other Massachusetts companies, steam and electric; and because the issue of such tickets in smaller amounts would facilitate their use by casual riders and thus lead to an unwarranted decrease in revenue

In regard to the plea of certain communities for exemption, the commission says: "Without much question other communities might have urged considerations equally pertinent to show that they also should be exempted. Such objections, we feel, are based upon a failure to appreciate the spirit and significance of the agreement. Under this the company will not secure all that it claims it ought to have, and this is equally true of certain communities." The commission concludes that the parties have been wise in coming to an agreement, and that the rates proposed are not unreasonable as a basis of trial.

Speaking of the decision, President P. F. Sullivan said:

"When we ask the public to turn in and help us make a success of this six months' experiment, we have their interests in mind as well as our own. City officials can aid us materially by regulating jitney competition. We do not ask that jitneys be abolished. All we ask for is a square deal. Unregulated jitneys divert from our treasury more than $300,000 a year.

"We are going into this experimental period with the feeling that we have back of us the public, and we shall take special pains to acquaint the public with what we are doing. If operating costs go up, we shall tell them that; and if they go down, it will be with special pleasure that we shall tell them that also. We are assuming that our business is the public's business, and that the public should know all about it."

# AMERICAN ASSOCIATION NEWS

## American Association Will Hold "Conference" Instead of Convention

At a meeting of the American Association executive committee in New York on June 26 the following were in attendance: L. S. Storrs, J. J. Stanley, J. H. Pardee, M. C. Brush, M. R. Boylan, F. R. Phillips, R. E. McDougall, Thomas Finigan, James H. McGraw, H. H. Vreeland, T. N. McCarter, C. L. Henry, J. D. Mortimer, J. N. Shannahan, H. C. Donecker and E. B. Burritt. The most important items taken up were as follows:

It was decided that a meeting of the executive committee should be held at such a date this fall as may be determined by the president and the chairman of the subjects committee. An invitation will be extended to all interested in the industry to meet at that time for conference. This meeting will be held in New York.

With regard to the work of the affiliated associations, it was recommended that all committee work except that which can be handled by correspondence should be held in abeyance; that the annual meetings be omitted; that the present officers be continued in office, and that the personnel of committees remain as at present until the 1918 convention. It is understood that no reports will be presented by any association at the conference.

The status of the manufacturers in the association was brought up for discussion in connection with the report of the sub-committee of manufacturers. This report was received, and after discussion it was decided that the committee on constitution and by-laws should be directed to prepare amendments to these instruments, to take their regular course, to provide as follows: For the election of two manufacturer members as members of the executive committee, with the understanding that if the manufacturers form an affiliated association the president shall be ex-officio member of the executive committee in addition to the other two. In this connection the executive committee recommended that the manufacturers be invited to form an affiliated association. The committee also approved the letter ballot canceling the annual convention.

In addition to the formal work of the meeting, President Storrs outlined the activities which have been carried on by the committee on national defense, and there was also an informal discussion on rates of fare.

## Engineering Executive Committee

The day following the meeting of the American Association executive committee the Engineering Association executive committee met and ratified the recommendations already referred to in so far as they affect the Engineering Association. The resignation of Vice-President G. W. Palmer, Jr., was also received with expressions of regret and appreciation of his faithful service. In attendance at this meeting were Messrs. F. R. Phillips, W. G. Gove, C. F. Bedwell, L. P. Crecelius and E. B. Burritt.

# EQUIPMENT and MAINTENANCE

HAVE YOU A GOOD WAY OF DOING A JOB?
*—Pass It Along*

*Read in This Issue:*
The Scheme Described by R. C. Cram for Cutting Asphalt Pavement

## Cutting Sheet Asphalt with Angle-Iron and Road Roller

### A Scheme for Simplifying a Disagreeable and Troublesome Job—Considerable Saving in Cost Effected by Its Use

BY R. C. CRAM
Assistant Engineer Way and Structure Department, Brooklyn Rapid Transit System

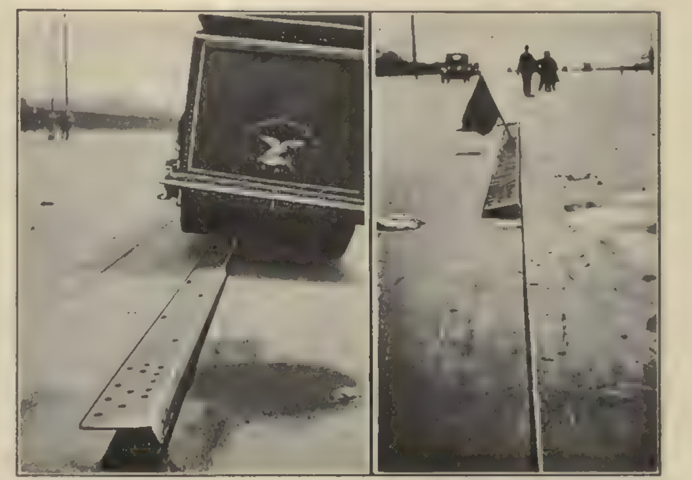
Cutting out sheet asphalt by means of the ordinary asphalt mattock or cutter, using manual labor, has always been a slow process and one which is particularly severe on the men themselves. In hot weather the job is not an enviable one and of late the labor has been difficult to get and more difficult to keep at such work.

When a job of removing a large amount of sheet asphalt surface presented itself under these conditions, it seemed advisable to adopt some other method which would be less primitive and which would obviate the labor difficulty. Some consideration was given to devices which could be attached to a road roller, as has been done elsewhere at times. The device described by M. E. Stark in the issue of the ELECTRIC RAILWAY JOURNAL for Jan. 20, 1917, page 123, also came to mind, but this could not be used on the work in hand because there were no car tracks upon which to operate. On the contrary, we were preparing to build an extension through a street paved with sheet asphalt.

Before attempting to equip a roller at considerable expense, the suggestion was made by C. L. Crabbs, engineer way and structure, that we try the simple expedient of laying a long piece of angle-iron having unequal legs, 4 in. x 3 in. or 6 in. x 3 in., upon the surface, with the shallow leg down to form a cutting edge, and rolling it into the pavement with our 8-ton tandem road roller.

A piece of 6-in. x 3-in. angle about 20 ft. long was accordingly obtained and the 3-in. leg was cut off to 2½ in. and sharpened slightly. This was cut off to prevent the edge from getting into the concrete in case the asphalt and binder was less than the original 3 in. in thickness on account of wear. It was then laid on the pavement and rolled in as suggested. At the first test the scheme was found to be successful and other pieces of angle were obtained which could be placed ahead of the roller, keeping it in continuous operation, the angles being removed from behind after rolling and placed ahead of the roller in turn.

Some fears were expressed before trial as to whether the angle could be removed readily after being rolled in, but no such difficulty arose. On the contrary, after rolling a few times the ends of the angles curl up slightly and one end stands up so that the angle may be removed with ease. It is almost unnecessary to say that we now expect to use the device for cutting asphalt in the 2-ft. strips adjacent to tracks requiring removal for reconstruction. There is a considerable saving in costs effected by this scheme, but comparative data are not yet available.


CUTTING ASPHALT PAVEMENT WITH ROLLER AND ANGLE IRON

Since trying out the angle-iron scheme so successfully we have hit upon an improvement which is now being substituted for the angle iron. This is a T-iron made by cutting off the head through the web of a 105-lb. girder rail and sharpening the cutting edge somewhat. The upright of the T forms the cutter, 2½ in. deep as before, while the upturned base, 6 in. wide, furnishes a surface upon which the roller will run even better than on the back of the angle and prevent damage to the roller in dropping from the cutter to the pavement.

AFTER CUTTING, THE ASPHALT IS STRIPPED OUT WITH LINING BARS, OCCASIONAL BLOWS WITH A SLEDGE BEING GIVEN

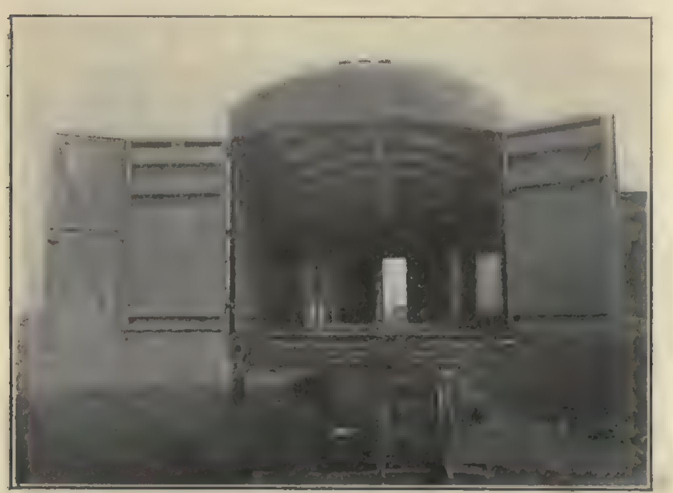
NEW STEEL FREIGHT TRAIL CAR FOR MICHIGAN RAILWAY

## All-Steel Freight Cars for Michigan Railway

### Ends of Car Swing Open and Facilitate Handling Shipments of Automobiles

Ten new arch-roof freight trail cars of unusually high-grade construction have recently been placed in service on the Michigan Railway. These are all of steel construction except for the wood floors, and are equipped with Rico anti-climbers. The length of the bodies over bumpers is 50 ft. and the width over sheathing is 8 ft. 11 in. The truck centers are 30 ft. apart. The body framing consists of side-sill angles, 7 in. x 3½ in. x ½ in., with intermediate longitudinal sills of 7-in. channels. The center cross-sills are made with 7-in. I-beams and the other cross-sills are 5-in. channels riveted to the longitudinal sills with the flanges turned down. An anti-telescoping plate of ⅛-in. steel is riveted to the longitudinal sills and bumpers. Underframe truss rods, 1½ in. in diameter, fitted with open-type turnbuckles, serve to reinforce the car against sag. The body bolsters are of the built-up type.

The 3-in. I-beam side posts are continuous from side-sill to side-sill, arching over the car to form the carlines. These are riveted to the side-sills and reinforced with double-angled plates. The sides of the cars are framed for a 6-ft. single sliding steel door in the center, and the ends are equipped with a 28-in. steel swing central door. Three of the cars of this allotment are constructed for hauling automobiles. The entire ends are made up of three steel doors which open up the full width of the cars to the ingress or egress of machines. The inside of these cars have a ⅛-in. steel lining extending from 6 in. below to 48 in. above the floor. The outside sheathing is 3/32-in. sheet steel extending from side-sill to letterboard.

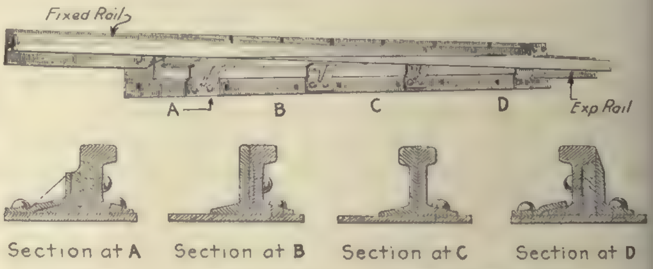


MICHIGAN RAILWAY FREIGHT CAR WITH END OPEN TO RECEIVE AUTOMOBILE

The car body and steel freight trailer trucks were built by the St. Louis Car Company.

## Use of Electrically Welded Joints on Exposed T-Rail Track

In order to extend the life of old T-rails on exposed tracks, where the joints have become badly cupped, the Public Service Railway, Newark, N. J., has made considerable use of the Lorain standard electrically welded joint. The company has a number of stretches of exposed track where this practice has been followed, the principal ones being on the line between Haddon Heights and Woodlynne, for a length of about 3½ miles, and another piece of about 1 mile in length on the Riverside line in Hamilton Township. The former was welded about four years ago and the latter a year later. These joints are giving entire satisfaction and the process is highly recommended by the company. Standard expansion joints, as shown in the accompanying sketch and cross-sections, were inserted at the beginning and end of every curve and also at intervals of 1000 ft. to 2000 ft. on tangents.



SKETCH AND CROSS-SECTIONS OF EXPANSION JOINT

Besides rejuvenating the rails the welded joint, of course, provides a perfect electric bond. It is not the practice of the Public Service Railway to weld the joints on newly-laid exposed track, because the mechanical joint is good enough for a number of years and is obviously much cheaper. On tracks laid in permanently paved streets, where the mechanical joint is inaccessible after it is once installed, it has become the standard practice of this company to weld all of its new rails and thus practically to create a jointless structure, thereby increasing its life.

## Feeder Cable Theft Alarm Signal

BY E. H. HAGENSICK

Superintendent of Electric Lines Omaha & Council Bluffs Street Railway, Omaha, Neb.

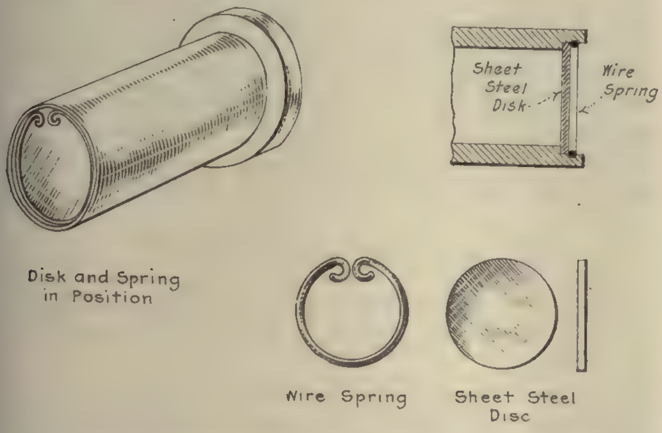
Trouble with the loss of feeder cable by theft after car service was off at night led to the installation on the Omaha & Council Bluffs Street Railway lines of a burglar alarm system. A small gage wire was strung from the substation over a route different from that of the feeders to the outlying districts. This was connected to the feeders at the far ends. A bank of lamps for resistance in series with a relay was mounted on the back of the switchboard in the substation and connected between the cable and ground. After service is off at night, the feeder cable, of course, is de-energized.

The small telltale wire is connected to the d.c. busbar, and current is carried to the end of the feeder and back over the latter through the bank of lamps and the relay to ground. Should anyone cut the feeder the loop circuit is broken and the relay armature drops to normal position and causes an alarm bell to ring. The night operator then quickly dispatches someone out over the cable route to intercept the thieves. The system has worked very successfully.

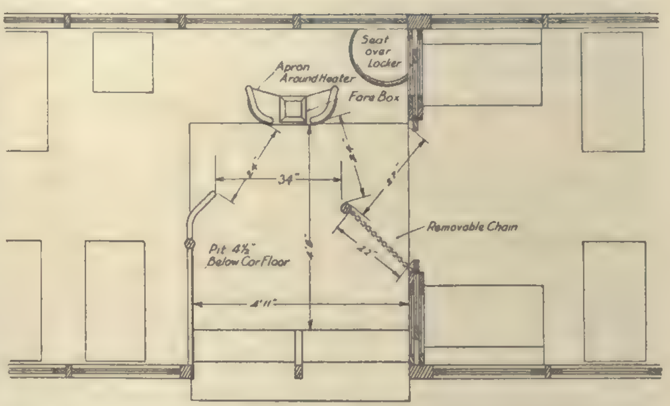
## Commutator End of Armature Bearing Protected by Simple Device

The commutator end of the armature bearing of the old-type GE-57 motor is usually protected by a sheet of canvas. This frequently comes off, works loose, or is damaged by the end of the armature shaft, thus allowing dust and dirt to get in and grind out the bearing.

This trouble has been overcome in the shops of the Elmira Water, Light & Railroad Company by cutting off the end of the armature shaft, cutting a groove around the inner circumference of the bearing and inserting there a sheet of No. 14 gage sheet steel. The latter is held in place by a piece of No. 6 spring steel wire bent to form an open circle and then sprung into the groove after the sheet-steel disk is in place.



PROTECTION FOR END OF ARMATURE BEARING



PREPAYMENT PLATFORM ARRANGEMENT FOR DENVER CARS

## Changing Denver Center-Entrance Cars for P-A-Y-E Operation

In order to install the pay-as-you-enter fare collection system on the center-entrance cars of the Denver Tramway, some slight changes in the platform arrangement were necessary. The longitudinal seat opposite the entrance was taken out, and also half of the first cross-seat behind this longitudinal seat, thus losing four seats. The space formerly occupied by this three-passenger longitudinal seat serves as an advantageous position for the conductor, since the floor is 4½ in. above the floor of the entrance well, and thus gives the conductor a good view of passengers entering and leaving the car.

The Johnson fare box used is mounted on an asbestos-lined wooden hood located in the center of the entrance platform, but on the car floor level as seen in the accompanying drawing. Since the entrance and rear half of the Denver cars are open the year around, an electric heater was installed underneath this hood, which will serve to take off some of the chill at the conductor's position. A seat installed in the corner at the central bulkhead lifts up and forms a locker for storing surplus transfers, etc. The arrangement of the two stanchions and prepayment rails is shown in the accompanying drawing. The rails beside the fare box serve to give passengers a hand-hold while waiting for change and

FARE BOX AND REGISTER INSTALLATION IN DENVER CENTER-ENTRANCE CARS.

VIEW OF DENVER PREPAYMENT ARRANGEMENT FROM OUTSIDE OF CAR transfers. The International register installed on the bulkhead of the car is operated by a foot pedal underneath the fare-box hood. This leaves the motorman's hands free for making change, issuing transfers, etc.

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## Economical Stenciling of Car Signs

BY W. P. LISH

Master Mechanic Fitchburg & Leominster Street Railway, Fitchburg, Mass.

Instead of using an ordinary brush in making stencil signs for cars we use a sheepskin pad attached to a 2-in. x 4-in. wooden block. This has been found to be an effective means of securing a sharp outline which gives the sign the appearance of having been printed.

CAR HAVING STENCIL SIGNS ADVERTISING PARK AMUSEMENTS

The letters are stenciled on starched cotton costing about 6 cents per yard by means of the two-plate process. In one instance twenty-four 12-in. x 18-ft. signs, one of which is shown in the accompanying illustration, were made in five hours. This has proved an especially effective means for providing park advertising signs for our cars.

USE OF SHEEPSKIN PAD IN MAKING STENCIL SIGNS

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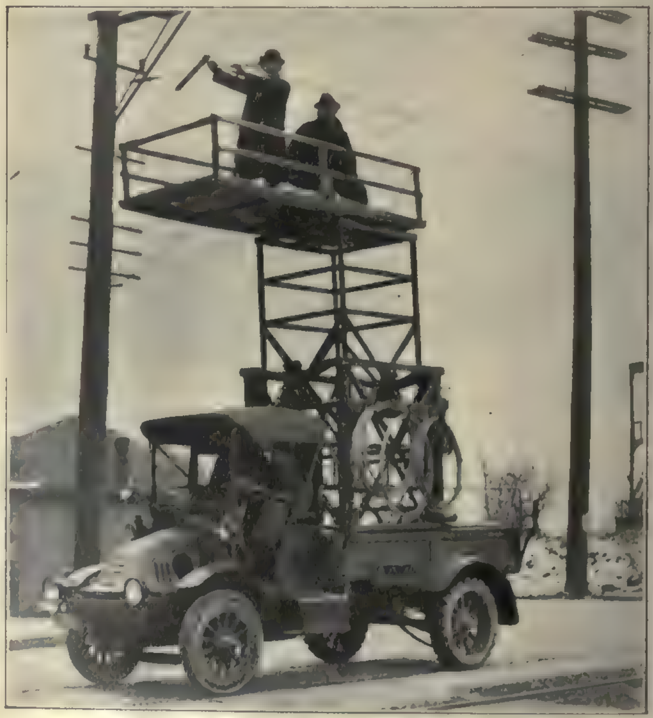
In an Ohio power plant a bonus system has been introduced under which each employee gets from $1 to $15 per month when the coal consumption is between 2.95 lb. and 2.55 lb. per kilowatt-hour. There was an almost immediate reduction from 3.10 lb. or more to 2.85 lb. or less when the plan was put into effect, a part of which was undoubtedly due to the system.

## Motor Trucks in Seattle

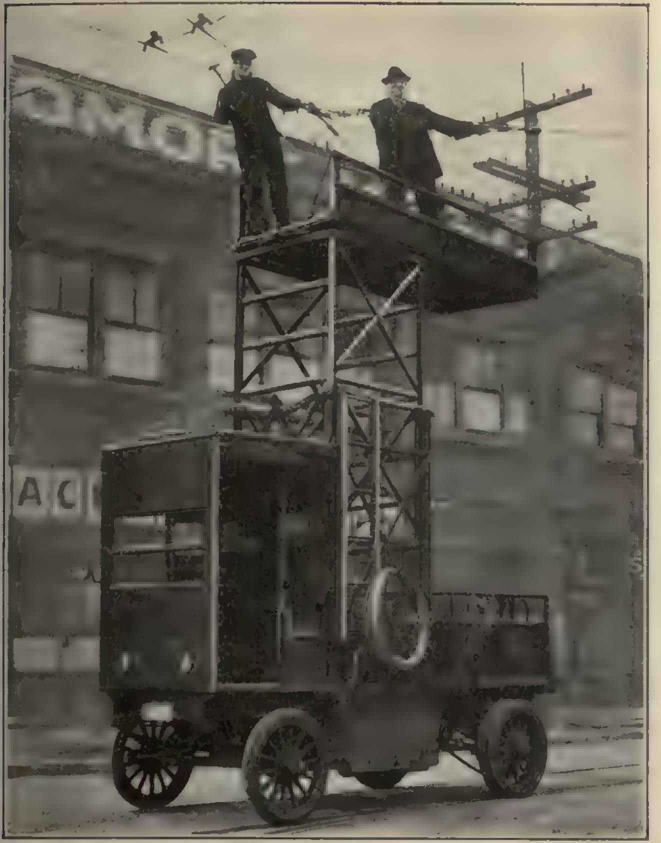
### Costs of Operation of Gasoline and Storage-Battery Vehicles in Railway and Lighting Service

For several years past the Puget Sound Traction, Light & Power Company has had in service a number of gasoline and storage-battery trucks in both the railway and the lighting and power departments. The latter department makes use of the major part of the equipment, and the most common type is the 1½-ton White truck, although there is a 5-ton ash car and a ¾-ton truck that is used for such light work as connecting and disconnecting services at scattered points about the city. There are also a ½-ton meter car and two 1½-ton units with storage-battery drive. Two of the 1½-ton gasoline trucks are used on heavy line construction work and another is equipped with a power-driven winch, just back of the driver's seat, and is used by the pole gangs. With the latter equipment poles are hauled out and delivered at the job by means of a regular pole wagon trailing behind the truck. Poles are loaded on this wagon by using the winch to wind up a line extending across the wagon and looped around the pole. Poles are also snaked short distances by means of a line on the winch where the ground is not good traveling for the truck. The company also has a derrick mounted on a gin wagon which is hauled as a trailer behind the pole truck and is used for raising and setting poles with the line from the winch, while transformers are frequently raised to crossarm platforms by the same means. In consequence, the company is able to do with this car all work requiring a horizontal pull without obstructing the street, as is the case when the truck drives off pulling a line attached to its rear.

As some of the trucks have been in service for a considerable period reasonably reliable cost data are available, and these are given in the accompanying table. This table shows the figures covering operation of four White gas trucks and three General Vehicle storage-



MOTOR TRUCK TOWER WAGON FOR RESERVE



STORAGE BATTERY TOWER WAGON OPERATED IN SEATTLE

battery trucks for one year. Of the trucks shown on the list only one, that used as a tower wagon, is used by the railway department, the others being lighting department equipment. The trolley trouble crews, however, have two cars, one a 1½-ton Kelly-Springfield gasoline machine that is kept at the carhouse for emergencies and the other the 1½-ton electric truck that is listed in the table, this latter being used for regular repair work to the overhead lines.

As an example of the cost of operation of a gasoline line truck extending over a longer period of time than covered in the table, there may be cited cost data on a truck that was placed in service on Oct. 15, 1912, the data extending to Dec. 31, 1915. This car was a 1½-ton White truck. The original cost was $3,300, and during the thirty-eight and one-half months included in the period under observation the car made 24,100 miles. The average mileage per gallon of gasoline was 6.1 and the average cost of gas per gallon was 13 cents. Approximately 30 miles were run per quart of lubricating oil at a cost of 14 cents per quart. On a basis of cost in cents per mile the following figures obtained:

| | |
|---|---|
| Cost of gasoline | 2.15 |
| Cost of oil | 0.36 |
| Cost of miscellaneous operating expense | 0.86 |
| Total operating cost (cents per mile) | 3.37 |
| Cost of tires | 2.41 |
| Cost of repairs | 3.58 |
| Total maintenance cost (cents per mile) | 5.99 |
| Total operation and maintenance cost | 9.36 |
| Interest | 2.53 |
| Depreciation | 9.15 |
| Additional equipment | 0.20 |
| Total cost (cents per mile) | 21.24 |

In the compilation of the above figures the wages of the drivers were in each case charged to the job on which the truck was operated. Depreciation was figured from an assumed present value of $1,000 for the car.

COST DATA ON TRUCKS OF PUGET SOUND TRACTION, LIGHT & POWER COMPANY

| Service | Cap'y of Truck, Tons | Miles Made for the Year | Total Cost per Mile, Cents | Cost per Mile for Fuel or Power, Cents | Miles per Gal. of Gas or per Kw.-Hr. | Cost per Mile per Driver, Cents |
|---|---|---|---|---|---|---|
| Gasoline trucks: | | | | | | |
| Line car...... | 1½ | 3,584 | 23.7 | 3.0 | 5.14 | 9.31 |
| Line car...... | 1½ | 7,735 | 24.2 | 2.33 | 5.75 | 12.0 |
| Line car...... | 1½ | 7,743 | 20.6 | 2.86 | 5.41 | 9.04 |
| Ash car...... | 5 | 8,654 | 42.6 | 5.10 | 3.05 | 28.2 |
| Electric trucks: | | | | | | |
| Meter car..... | ½ | 4,392 | 26.0 | 1.78 | 1.38 | 9.6 |
| Tower wagon. | 1½ | 2,332 | 27.0 | 3.15 | 0.79 | 18.5 |
| Dump car.... | 1½ | 4,543 | 47.5 | 6.22 | 0.42 | 27.0 |

NOTE—Cost of fuel for gasoline trucks includes lubricating oil. Line cars used by lighting department; tower wagon by traction department

## Distinguishing Between Limited and Local Trains

The Chicago, North Shore & Milwaukee Railroad has adopted a plan of painting the front end of its limited cars above the window sills an orange color in order that they may be distinguished from the local passenger cars. This was done for the safety of both employees and passengers waiting for trains, since by this means they can tell if an approaching train is a limited and will not stop. This coloring also sets the cars off from the general green of the landscape and helps to avoid crossing accidents due to failure on the part of pedestrians or vehicle drivers to see approaching trains.

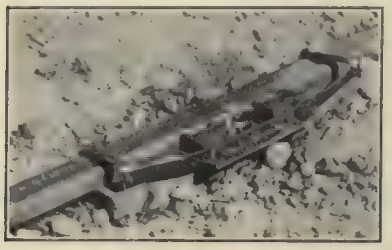
## Good Results from Electric Bonding Machine

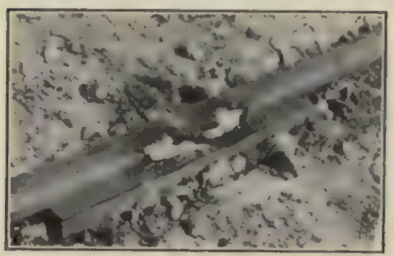
One hundred joints are bonded in a nine-hour day by the regular track men of the Worcester (Mass.) Consolidated Street Railway, an electric-arc bonding equipment being used. The accompanying illustrations show a general view of the bonding gang, the mold set in position at the joint and the completed bond after the welding has been performed. The equipment was made by the

TRACK BONDING WORCESTER (MASS.) CONSOLIDATED STREET RAILWAY

Lincoln Bonding Company and has been previously described in the ELECTRIC RAILWAY JOURNAL. It consists essentially of a motor-generator set which supplies a bonding current of 250 to 300 amp. at a low voltage, the supply power being taken from the 600-volt overhead trolley.

The apparatus is compactly mounted on a three-wheeled truck made to operate on the running track. As it can be removed by two men in twenty seconds on approach of a car, the bonding is done without interrupting traffic. It requires about three minutes to make a complete bond, including the attachment of the mold, the starting up of the motor-generator set, the welding process, the removal of the mold and the rounding up of the bond terminals. The time required for the actual welding is forty to fifty seconds. After removing the mold the ends of the bond are hammered round to divert wagon wheels.


MOLD IN PLACE FOR ARC-WELDED BOND


ARC-WELDED BOND AFTER COMPLETION

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## Air Press for Armature Coils

BY G. B. SISSON

Mechanical Department, Georgia Railway & Power Company, Atlanta, Ga.

One of the features of our armature room is a home-made pneumatic press devised by J. E. Eaves, master mechanic, for pressing armature coils. It replaces a slow hand-operated screw press, and makes a more uniform coil than was possible with the varying human pressure exerted with the screw press. The controlling mechanism is made from an old whistle valve and is operated by a pedal so that both the operator's hands are left free to hold the coil. This press has been in satisfactory use for several years.

HOME-MADE PNEUMATIC PRESS FOR ARMATURE COILS

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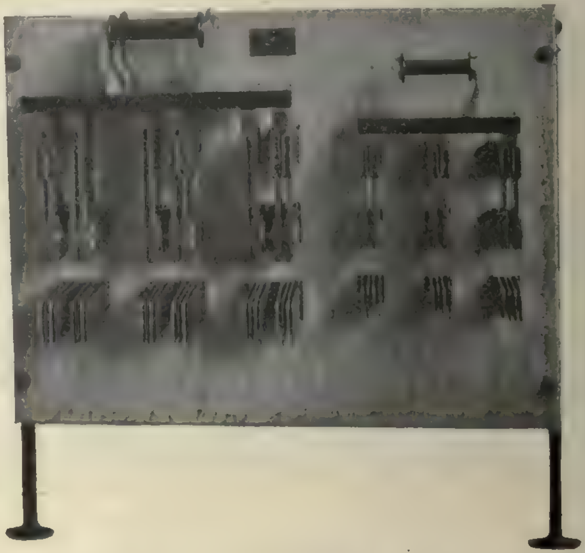
Ventilation of manholes on the system of the Augusta-Aiken Railway & Electric Company is accomplished by connecting to the manhole a 4-in. pipe which extends several feet in the air and supports a small wooden box. In this box there is an electric fan which forces fresh air into the manhole while the warm air is being discharged through the openings in the manhole cover.

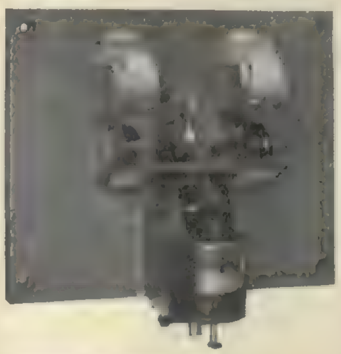
## New Developments in Electrical Switches

In order to reduce the effort necessary to operate the enormous lever switches used for starting large synchronous converters from the a.c. side in conjunction with auto-transformers, the split-lever starting switch shown in the accompanying illustration has been developed by the General Electric Company. The illustration shows two triple-pole lever switches for starting a six-phase converter. The switch at the left is of the new type. It comprises actually two triple-pole switches, each with its own handle and crossbar. Thus it is necessary for the attendant to move only one part of the switch at a time instead of handling the entire weight, as in the older type. Switches of this type have been built up to 5000 amp. capacity.


NEW TYPE OF ROTARY CONVERTER STARTING SWITCH

To start a synchronous converter, the switch blades are connected to the two-thirds voltage tap for but a short time, the switch jaws being constructed so that contact is made only with the outside switch; *i.e.*, the part which is thrown first. When this half of the switch, with one-half the blade area, is thrown down, it carries the current until the remaining or back half of the switch has been thrown into the lower position

A type of double-pole solenoid-operated field switch has been developed by the same company which is similar in construction to the non-automatic solenoid-operated air circuit breakers, the principal points of difference being the omission of carbon secondary contacts and the addition of a field-discharge switch. The field-discharge switch is so arranged that the opening of the solenoid-operated field switch introduces a resistance across the field of sufficient value to prevent injury to the field-coil windings by the inductive kick.


SOLENOID-OPERATED FIELD SWITCH WITH FIELD DISCHARGE FEATURE

# London Letter

## London Has Bus Strike—London County Council Lines Under Heavy Burden—Tramway and Vehicle Workers Consider Status of Women Employees

*(From Our Regular Correspondent)*

London suffered during the past month from a bus strike. For five days no buses were in use on the streets, except for a few running on the munition routes in the Woolwich neighborhood. The withdrawal of nearly all bus communications in London was seriously felt. The tubes naturally became extremely overcrowded, and it was with a feeling of satisfaction that the public learned that an agreement had been reached by the intervention of the government. A conference was held between representatives of the London General Omnibus Company and the London & Provincial Union of Licensed Vehicle Workers, with representatives of the Transport Workers' Federation present. The Right Hon. Arthur Henderson, M. P., intervened on behalf of the government. It is understood that the application for a war bonus will be proceeded with by the committee on production, and arrangements have been made so that the relations between the company and the Union of Licensed Vehicle Workers are again placed on a satisfactory basis. The conference took place in Mr. Henderson's private room. Afterward a meeting of the representatives of the men was held, and as a result the men accepted Mr. Henderson's terms. The next day London had a full complement of buses at work again. The war bonus asked for is 10s. a week for drivers and conductors, and 5s. for the skilled and semi-skilled garage staff. This matter will be settled by arbitration at a conference to be presided over by Sir George Askwith.

War conditions have imposed heavy financial burdens on the London County Council Tramways. In order to secure additional revenue the highways committee has decided to suspend halfpenny fare stages and ordinary return tickets. Workmen's return tickets and children's fares will not be affected. It is estimated that these changes will increase receipts by £60,000 and £45,000 a year respectively. In its report the committee pointed out that the annual cost of war wages and bonuses and allowances to dependents was £268,400. The revenue estimates for the current financial year showed a deficit of £89,402, which would more than exhaust the general reserve fund. Under the abnormal conditions now prevailing the difficulties in the way of efficient fare collection have been considerably increased, and 54 per cent of conductors at the present time are women, most of whom have only recently entered the service. Distances are covered very rapidly, and the size of the Council's cars, and the conditions under which they are operated, make it extremely difficult to deal with halfpenny passenger traffic, distances being covered with such rapidity. The Council's cars are of the largest type in use, and the average speed of approximately 9 m.p.h. is in excess of that prevailing on any other tramway in this country.

Terms have now been agreed upon for the purchase by the London County Council of the portion of the undertaking of the London United Tramways, Ltd., within the county area. The lines affected are situated in the borough of Hammersmith, are about 5½ route-miles in length, and are worked on the overhead trolley system. They include the London terminals of the system at Hammersmith Broadway and at Shepherd's Bush Green, the system itself extending to Hampton Court, Hounslow, and other points in Middlesex. The agreement includes provision for running arrangements between the Council and the company; for the transfer to the Council of the Chiswick power station and plant, and for the supply by the company of power for the running of cars on the purchased lines for twenty-one years free of cost. Including the purchase price (£235,000) and costs and expenditure on reconstruction work, the capital outlay will amount to £320,899. As regards the lines tc be purchased it is estimated that there will be an annual surplus on working of £22,917 after providing for renewals, but exclusive of power and debt charges.

Sir Edward Henry, commissioner of police of the Metropolis of London, has given notice regarding motor omnibuses that new vehicles presented for licensing must be lighter in weight and with a better form of power transmission than the existing type. He invites the co-operation of manufacturers. In the past it has been found that motor omnibuses approaching the maximum allowed of weight unloaded and of permissible speed caused much annoyance and damage through noise, vibration, etc. The present vehicles weigh without load about 3½ tons, and when fully loaded with passengers about 6 tons.

The men in the employ of the Dundee tramways department are to receive another increase in wages. The advance proposed is 5s. per week in the case of drivers and conductors and 2s. in the case of cleaners. This decision was reached at a recent meeting of the tramways committee when a deputation was heard in support of the application. The request was for an increase of 6s., and was made through the local branch of the Amalgamated Association of Tramwaymen & Vehicle Workers. Prior to hearing the deputation the committee considered a report on the relative rate of wages paid to tramway employees in other towns in Scotland. Only in Glasgow are the men better paid than those of Dundee. The decision was unanimous. The increase is granted on a fifty-four-hour week and makes the minimum and maximum rates as follows: Drivers, 35s. to 39s.; conductors, 31s. to 37s.; cleaners, 32s. to 34s., exclusive of 5s. extra for a sixty-hour week.

Interesting information is set forth in the annual report of the Nottingham tramways committee. While there was an increase of £7,762 in the total receipts last year, the expenditure also increased by £17,450, due chiefly to car repairs, war bonuses and separation allowances. There was a reduction of 118,911 in the number of miles run by the cars, yet the passengers carried totaled 1,739,726 more than the previous year. The number of penny tickets issued was 30,115,111, workmen's penny tickets 4,028,572, halfpenny ordinary tickets 4,028,572 and three-halfpenny ordinary tickets, 3,748,623. The depletion of the staff and inability to secure necessary supplies caused great difficulty in meeting the traffic requirements. Since the commencement of the war 305 men have joined the colors. Of these twelve have given their lives for their country. One motorman and one conductor have been awarded the military medal for conspicuous bravery at the front. Upward of 100 men have also left the service for munitions and other work.

The twenty-seventh annual delegate meeting of the Amalgamated Association of Tramway & Vehicle Workers was held at Leicester during the month of May. It was stated that one of the difficult problems that the society had to consider was the question of women tram drivers. The hope was expressed that the members in every town would oppose the introduction of women, and that where circumstances were too strong for them successfully to resist the innovation, the members would insist on the same rate of wages being paid to the women as to the men. The position taken by the Board of Trade and the Ministry of Munitions was that there could be no interference on the part of the authorities until it was demonstrated that the employment of women drivers was a danger to the public. The conference passed a resolution that in view of the dangers attending the introduction of women drivers the Council should take definite action, and that there were sufficient discharged soldiers and sailors capable of the work if the maximum rate of the town were paid.

Edinburgh magistrates have considered the further renewal of licenses for the cable cars in Edinburgh. Reports were submitted by the burgh engineer and the hackney carriage inspector which showed that, despite the fact that the company was very badly handicapped by the lack of material and men, considerable improvement had been made in the running plant. The tramway asked that the licenses should now be granted for one year, as formerly. The magistrates decided, however, to limit the licenses to three months, as they had been doing more recently.

It is expected that as a result of the scheme submitted to the Middlesex County Council recently, fares will be increased on the Metropolitan Electric Tramways, Ltd., at an early date. Since 1911 the company has not yielded any divisible profit, and there has been a steady increase in the amount by which capital charges and working expenses have exceeded the receipts, owing to increased competition and a steady rise in the cost of operation. It is further estimated that the war bonus to employees, recently asked for, would add £30,000 to the bill for wages. A. C. S.

# News of Electric Railways

Traffic and Transportation
Financial and Corporate
Personal Mention
Construction News

## St. Louis Settlement Terms

### First Joint Conference Between City and Company Representatives Results in Publication of Proposal of the City

The first joint conference on a tentative plan to compromise the United Railways mill tax was held on June 26 in the office of Mayor Kiel of St. Louis, Mo. The five members of the United Railways committee, headed by Richard McCulloch, president, conferred with the city's committee headed by Mayor Kiel. Eight proposals were submitted to the joint conference committee by City Counselor Daues, as forming the basis of a possible agreement between the city and the United Railways. They represent the city's reply to the company's proposals of last November. The list of proposals is as follows:

#### WHAT THE CITY PROPOSES

1. The mill tax ordinance shall be repealed on the date when the new agreement becomes operative, and shall be paid in full, with accrued interest, up to that time.

2. For the accrued mill tax and interest to be paid the city, the company may issue bonds and add the amount to its capital valuation on which a reasonable return may be earned in future. The bonds are to be retired by amortization within a term of years to be fixed.

3. New indeterminate franchises, subject to the provisions of article 19 of the charter, shall be granted to the company. The city shall have the right to acquire the company's property, paying for it in municipal 4-per cent bonds, at the end of the first ten-year period, or the end of any five-year period thereafter, as provided in the charter. The franchises shall be for a term ending in 1948, or for fifty years, the limit fixed by the charter for the life of a franchise.

4. The board of directors to consist of twelve members, of whom —— shall be city officials, the railway to elect qualifying shares to and elect on the board of directors —— city officials, who shall be ex-officio members.

5. The management of the company to be under a board of control, consisting of the president or acting manager of the company and the director of the public utilities of the city, or his commissioner or deputy, said board to decide also on all necessary rearrangements, extensions, additions and improvements to be made by the company as fast as required and as the earnings permit. All difficulties and disagreements between the members of the board of control to be adjusted by arbitration. A third member to be appointed by the St. Louis Court of Appeals in the event of a disagreement. All official salaries and expenses to be subject to the approval of the board of control.

6. The city and company to agree on a fair capital value on which the company shall be permitted to earn a return of —— per cent, which shall be cumulative. The company also to be permitted to earn a reasonable return on sums expended for extensions, additions and betterments, to be determined by accounting methods set out in the ordinance.

7. All earnings shall be disposed of as follows: (a) Operating expenses, including accident reserve, depreciation funds and taxes. (b) A percentage, to be fixed, on capital valuation. (c) Surplus after providing for (a) and (b) to be divided between city and company on a percentage basis to be fixed, or applied to the improvement of transportation.

8. An ordinance containing these provisions shall be passed by the Aldermen and accepted by the company.

The committee which considered the matter on June 26 consisted of five members of the city government and five representatives of the company. At the opening of the meeting Mr. Daues expressed the hope that the plan would be adopted. It was first intended that the protocol should fix the company's new capitalization at not more than $60,000,000, and that the rate of earnings on this amount should be 6 per cent, with a further provision that the net surplus be divided in the proportions of 60 per cent to the city and 40 per cent to the company. In a preliminary conference between Counselor Daues and Attorney Thomas M. Pierce, for the company, these specific conditions were omitted, and it was decided to refer them to a joint committee of four, two members to represent the city and two the company. In addition the questions of the number of directors and the manner of paying the mill tax also were left open. The first proposition that the city should have four officials—the Mayor, comptroller, president of the Board of Aldermen and director of public utilities—as directors of the company, was not urged very strongly at the conference. The Mayor suggested that the chairman of the Aldermanic public utilities committee be included in the directorate, but this was disapproved by Mr. Daues. President McCulloch of the company held that as the city wanted "only representation on the company's board, and not control," three officials would be as good as four or five to protect the city's interests. He urged that only the three elective officials be named.

Mr. Daues said that he thought the company ought to be allowed to earn 6 per cent dividends, and that an additional 1 per cent of earnings might be allowable for extensions and improvements. He said that he believed a fifty-year franchise was necessary to get best results, and that the city had no power, under a recent Supreme Court decision, to fix the rate of fare by ordinance. The Supreme Court, he pointed out, decided that the rate-making power rested solely with the Public Service Commission.

The joint conference was to meet again on July 6.

## Mr. Beeler Retained in Boston Case

### He Will Report to Massachusetts Commission in Connection with Boston Elevated Revenue Case

John A. Beeler has been retained by the Public Service Commission of Massachusetts under Chapter 373, acts of 1917, to assist the board in studying the revenue problem of the Boston Elevated Railway. The commission is to report to the next Legislature whether the existing 5-cent fare contract between the company and the State should be altered on behalf of affording the company increased net revenue. Mr. Beeler will investigate the possibilities of increasing the net revenue and was selected by the board because of his extended experience as a street railway manager. He was formerly vice-president and general manager of the Denver (Col.) Tramway and has lately devoted his entire time to consulting work in connection with public utility problems and has recently completed a report upon operating methods on the Bay State Street Railway. Mr. Beeler's office is at 52 Vanderbilt Avenue, New York City. His report on the Boston Elevated case will be submitted to the commission in the early fall.

Mr. Beeler, who has established himself in New York as a consulting engineer, resigned from the Denver Tramway in September, 1915. He was born in Towanda, Ill., on June 28, 1867, and entered street railway work in Cincinnati in 1886. His connection with the railways in Denver dated from 1888. Mr. Beeler was among the first to adopt a double-truck trail car for handling rush-hour loads or peak traffic. He also introduced a number of other features that created much interest in the railway field. One of these was the employment of student conductors, selected from local universities and high schools, to man the trailers operating during the periods of heaviest travel.

## Philadelphia Legislation Lost

### Measures Sought by the City and Opposed by the Philadelphia Rapid Transit Company Not Passed in Legislature

The program of rapid-transit legislation sought by the city of Philadelphia has been lost in the Legislature. The whole matter was tied together in four bills, the provisions of which have been reviewed previously in the ELECTRIC RAILWAY JOURNAL. Briefly these measures sought to give the city the power to take over the lines of the Philadelphia Rapid Transit Company by exercising the right of eminent domain, compensation to be fixed by the Public Service Commission; a constitutional amendment increasing the city's borrowing capacity so as to provide this compensation, and the so-called Salus bill to provide through routing of the city's lines on the Philadelphia Rapid Transit Company's lines and also to empower the commission to decide the question of fares and transfers.

The fight on the measures was a hot one. In the closing hours A. Merritt Taylor, former director of the department of city transit, issued a statement in which he "scotched" the resolution backed by Mayor Smith. On the other hand the Mayor threatened reprisals and is said to be looking toward independent operation of the rapid-transit lines now under construction. He has, however, signed the ordinance recently passed by Councils which empowered the city to draw another lease and submit it to the Philadelphia Rapid Transit Company. In the first flush of his disappointment at the loss of the so-called Salus bill the Mayor pilloried the entire electric railway interests of the State. He is quoted as follows:

"The united power and influence of all the street railway interests of the State were exerted to defeat the Salus bill. Whole delegations were turned away from us through telegrams which reached them to-day.

"Before we arrived at Harrisburg to-day (June 27) I am certain that we had votes enough to carry the bill, but as it developed, we were eight votes short of a constitutional majority. This change, to my mind, was wholly brought about because of the coercion of the street railway interests of the State working together."

## Dallas Deal Delay

### Messrs. Strickland and Hobson Secure Extension of Time in Which to Consolidate Electric Railway and Lighting Services

The city of Dallas, Tex., has extended for a period from July 2 to Sept. 27 the time in which J. F. Strickland and C. W. Hobson, to whom were granted the service-at-cost franchises for operation of electric railways and electric lighting plants in Dallas, may carry out their agreement to consolidate the present lines under the companies which they propose to organize. The extension was granted at the request of Messrs. Strickland and Hobson, and after the favorable action had been taken by the City Commission, Messrs. Hobson and Strickland gave out the following statement to the public:

"We regret we were obliged to ask for an extension of time in which to accept the light and street railway franchise ordinance, but the delay incident to the litigation involving the validity of said ordinances made it imperative. The things necessary to be arranged preliminary to the acceptance of said franchises are numerous and time-consuming, and some of them could not be undertaken so long as the validity of said franchise ordinances was involved in litigation.

"This litigation has but very recently reached a conclusion, and the time since then has been entirely inadequate for arranging a matter of such magnitude and detail. An extension has been asked and granted until Sept. 27, 1917, but this does not necessarily mean that acceptance will be postponed until that time, for we shall push matters diligently and will not delay any longer than is actually necessary. It must be remembered that the transfer of the properties in question is one that requires very considerable time and that both properties must be transferred, as the transfer of one without the other would be of no avail."

## New York Men Present Demands

### Committee of Third Avenue Railway Employees Seeks Conference with Management on Wages and Other Matters

A committee of four employees of the Third Avenue Railway, New York, N. Y., on July 4 sent the following letter to Edward A. Maher, president of the company:

"We, the undersigned committee representing the employees of your company, have been instructed by your employees to submit to you the following requests:

"First—We request that the company, through its accredited officers, will meet and treat with the committees and representatives of the men on all grievances and complaints that may arise in the future.

"Second—We request that the wages for motormen and conductors on and after July 10, 1917, shall be as follows: For motormen and conductors, first year in service of the company, 35 cents an hour; for motormen and conductors who have been one year or over in the service of the company, 40 cents an hour.

"Third—We request that the workday for motormen and conductors shall be on the basis of a maximum of ten hours, to be completed in twelve consecutive hours, and that time and one-half be paid for all work after the completion of the regular scheduled run as above provided.

"We would request that you set a date and name a place where we can take up with you, as the representatives of the employees, these questions."

The letter was given out for publication by William B. Fitzgerald, general organizer of the Amalgamated Association of Street & Electric Railway Employees of America. He stated that since it had become known that demands would be made the company had circulated among its men a petition to the effect that the men were satisfied with the new scale of wages established on July 1. This scale raised the pay of a man who had been in the employ of the company for six months from 27 cents to 30 cents an hour; the pay of the man who had been with the company for more than a year to 32 cents, and the pay of a man who had been in the company's employ for fifteen years to 34 cents an hour. At the time of the strike in New York about a year ago the demands submitted were for 30 and 33 cents, as compared with 35 and 40 cents in the new demands.

Mr. Maher, president of the road, gave out a statement on the night of July 4 explaining his reasons for not choosing to treat with the committee of four appointed by the union and said that the men had been dismissed from the service of the company for their action in rejoining the association. Mr. Maher said he knew that the men appointed did not represent the employees of the Third Avenue Railway, but that they represented an association that had no regard for "its obligations, contracts or promises."

The Amalgamated is said to be looking first toward the unionization of the men on the Third Avenue lines with the end in view of calling a strike there. The Third Avenue Railway has replied to the committee which presented the demands to it by discharging the men on the committee.

The brotherhoods organized after the strike last year on the lines of the Interborough Rapid Transit Company and the New York Railways passed resolutions on July 5 denouncing the leaders of the Amalgamated and condemning any proposal to force a strike at this time. Copies of these resolutions were sent to the Mayor, Public Service Commission, United States District Attorney and district attorneys of New York and Bronx Counties. The resolutions adopted by the Interborough lines quoted President Wilson's proclamation to the men who run the railways, reviewed the attempt made last fall to interrupt service on the Interborough lines, called attention to the dynamiting of the subway during the last strike and the convictions that followed, and concluded with the demand for "all of our rights to carry out our obligations to the community and to the nation peaceably and without interference." The resolution adopted by the brotherhoods of the employees of the New York Railways were along similar lines. Committees of the brotherhoods of both companies called on officials of the companies and told them that they were satisfied with the conditions and wages which now prevail.

## Ten Killed in Niagara Gorge

### Car of Niagara Gorge Railway Drops Into Gorge Near the Whirlpool Rapids

Heavy rains undermined a section of track on the Niagara Gorge Railway about 50 ft. south of the cantilever bridge at Niagara Falls, N. Y., and a large double-truck open observation car carrying between fifty and sixty-five passengers running upon this stretch of roadbed on the afternoon of July 1 toppled down a 30-ft. embankment into the lower gorge of the Niagara River. Three days after the accident ten known dead and thirty-one injured had been accounted for by company officials, but estimates disagree as to the number of missing. The register was not recovered in the wreckage. The motorman of the car jumped and was saved, but the conductor was lost.

The Niagara Gorge Railway operates the double-track electric line in the lower American gorge between Lewiston and Niagara Falls. This route with the line of the International Railway between the upper steel arch bridge at Niagara Falls, Ont., and Queenstown, Ont., constitutes the Niagara Gorge belt line. On the day of the accident cars were being operated under a fifteen-minute headway. The route of the railway winds in and out among the large rocks in the lower gorge, and for a great part of the distance the roadbed is supported upon a bed of concrete. Every morning before regular travel is started over the line a pilot car is sent over the route to report on the condition of the track and roadbed.

#### SOLDIER SOUNDS ALARM

About twenty minutes before the accident, a soldier guarding the lower abutments of the Cantilever and Lower Steel Arch bridges saw part of the roadbed under the track slip into the gorge. Realizing the immediate danger, he telephoned officials of the Niagara Gorge Railway of the undermined track and the company's inspector at Lewiston was advised not to allow any more cars pass that point. One car was then between Lewiston and the point of the wash-out. A special Gorge Route car started from Niagara Falls, N. Y., with company officials and others, but when they arrived the regular car had reached the danger point and had fallen into the river. When the car ran upon the undermined track, it toppled toward the river and fell bottom side up onto submerged rocks and again tipped over into the river. Before the car took its first somersault, the motorman leaped and several passengers jumped. Others were hurled into the gorge and some are said to have been carried down the river into the Whirlpool only a short distance below.

National guardsmen jumped into the river with ropes tied about their bodies and rescued a number of passengers. Several others were pulled from the wreckage an hour after the car fell from the rails. Special cars carried the dead and injured to Niagara Falls. The International Railway sent a wrecking car to the scene of the accident and hauled the trucks and floor of the car from the river, but the roof and other parts of the car were carried down the river into the Whirlpool.

Burt L. Jones, vice-president and general manager of the Niagara Gorge Railway, was on the scene within twenty minutes after the accident. In a statement to the newspapers, Mr. Jones placed the responsibility for the accident upon the soldier who saw the roadbed slide into the river because he did not rush down upon the tracks and flag all approaching cars. City officials of Niagara Falls, N. Y., also placed some blame upon the soldiers for not making an effort to stop the approaching car by firing a gun or giving some other sign of warning.

Two investigations are being made into the accident. One is being conducted by the Niagara county authorities and the other by the Public Service Commission for the Second District through Charles R. Barnes, its electric railway inspector. At the investigation before the county authorities, officials of the Niagara Gorge Railway were asked why power was not shut off immediately warning of the washout was received. The superintendent of the company and its general manager said that the time between the warning and the accident was too short for them to stop the approaching car.

Twenty-four hours after the accident the undermined track had been repaired and regular traffic was resumed over the entire route from Lewiston to Niagara Falls.

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## M. O. Agitation in New York

### Tammany Will Seek to Capitalize Present Plight of Utilities by Promising to Fight for Municipal Ownership

Tammany Hall came out on July 1 for a municipal ownership platform in the present New York City municipal campaign. A statement issued by the Democratic County Committee, which includes its proposals for incorporation in the Democratic Fusion platform, says:

"The supply of transportation, light, heat and power is of the utmost importance to the community. The services rendered have become a necessity to the life, health, comfort, convenience and industry of the city. These great services are monopolies, and whatever is of necessity a monopoly should be a public monopoly, especially where it offers a service of universal use. Thus only can the cost of these indispensable public services be reduced to the cost of similar services in more progressive cities, and thus only can the selfish resistance of the public utility corporations be made to give way to a progressive development of the city in the interest of the people.

"We oppose the further granting of franchises for public utilities. The prodigality with which these public assets in the past have been given or bartered away for inadequate consideration explains the penury of New York City.

"The present city administration was elected on pledges that the city government would be conducted on progressive lines, in the interest of the citizens as a whole and not of special privilege. These pledges have been forgotten or ignored, and the Fusion administration has steadily pursued a course of obsequious deference to the public utility corporations and predatory and privilege seeking business.

"New York City faces the enlightened demands of the present day for a scientific extension of municipal function with a depleted treasury and an exhausted borrowing power; while there is not a valuable privilege or franchise, an immunity or a power of extortion sought or proposed by the public utility corporations of the city which has not found in the present Fusion administration eager and artful advocates and apologists. The city's revenues have been wasted in ill-considered and improvident undertakings, which today stand as costly and futile commitments without possibility of completion."

On July 3 the newspaper men at the City Hall pressed Mayor Mitchel for a statement in regard to his views on municipal ownership. He is reported to have answered:

"I think now as I have always thought. I have always been in favor of municipal ownership in many fields. Particularly was I in favor of it in the subway matter. I should like to see the city acquire the electrical subways (conduits). If we only had the money we might do it tomorrow. And it may be, before we get through, that we will have the money."

On the same day Public Service Commissioner Hervey also had something to say about municipal ownership. His remarks were taken as indicating the sentiment of at least a majority of the commission. Mr. Hervey said in part:

"The representatives of at least two of the surface railway systems of the city have declared that unless they are granted new sources of revenue they will be forced into the hands of receivers, with consequent inconvenience to the public through the disintegration of their systems. Those statements become increasingly important in view of the threat of renewed labor strikes on the lines of the companies and with the at least coincident revival of municipal ownership as a local political issue.

"It would be unfortunate, in view of the large measure of control of the situation possible under the present laws, if the public should get the impression that its only protection was through municipal ownership of these roads. If we are going to have municipal ownership, let us begin by acquiring those public utilities which are making great profits out of the public and not those which their own managers declare are on the verge of bankruptcy."

# Truce in Seattle

## Difference Between Employees and Company to Be Arbitrated—President Leonard Reviews Situation Confronting Company

A truce was declared on June 26 following several conferences between representatives of the Puget Sound Traction, Light & Power Company and the employees of the Seattle division, and arbitrators were appointed by the company and the union to consider the matters that had previously made a strike seem likely. C. J. Franklin, a consulting engineer of Portland, Ore., formerly general superintendent of railways of the Portland Railway, Light & Power Company, was named by the company as its choice for one of the three members of the arbitration board before which will be submitted the claims of the employees for better wages and shorter working hours. James A. Duncan, secretary of the Seattle Central Labor Council, was appointed by the representatives of the employees as their choice as arbitrator. Mr. Franklin and Mr. Duncan will appoint the third member of the board. The board will then organize and begin the hearings. The decision of the arbitrators will be binding upon both sides to the arbitration, for a period of one year.

A. W. Leonard, president of the company, says that a schedule of increases asked by the employees will be submitted to the board of arbitrators. Negotiations on behalf of the employees are being conducted by the officers of Local 587 of the Amalgamated Association of Street & Electric Railway Employees of America, first organized in Seattle in 1912, and comprising, it is stated, 1000 employees of the company. President Leonard, Vice-President McGrath, and Manager Kempster represented the company at the conferences held with the employees.

### WHAT THE MEN DEMAND

The present situation had its beginning, it is asserted, on June 20, when twenty-seven platform men signed a petition for membership in the Seattle division of the Amalgamated Association. The subsequent suspension of these men by the company is alleged by the employees. On June 21 a committee of trainmen called on President Leonard of the company, made certain requests regarding wages and working conditions, and set June 23 as the time for reply. On June 22 the company voluntarily advanced the wages of all its trainmen, the third time since the first of the year. On June 23 the committee was invited to President Leonard's office for a conference. At this meeting the trainmen presented the following requests: That all platform men receive 37½ cents an hour during the first year, and 40 cents an hour after that; that the workday be reduced to eight hours in eleven consecutive hours; that time and a half be paid for all time served in excess of eight and one-half hours; that extra men, those just breaking in or those who are substituting without regular runs, be paid $75 a month.

### PRESIDENT LEONARD'S STATEMENT

In a statement which he made, President Leonard said:

"We were asked to arbitrate certain requests made by a committee of our employees. The arbitration the men ask for they specifically stated was that provided for in the franchise under which we are operating in Seattle. We expressed our willingness to arbitrate the questions submitted. The franchise provides: 'That if any dispute shall at any time arise between the said grantees, their successors or assigns, and their employees as to any matter of employment or wages, such dispute shall be submitted to arbitration. The grantees, their successors and assigns, and their employees, shall be parties to any submission and shall be entitled to be heard by the arbitrators, and any award when made shall be made binding and conclusive for the period of one year from its date, upon the grantees, their successors and assigns, and upon their employees.'

"Observance of that provision will protect the public against unnecessary or embarrassing loss of service. On June 21 the committee presented its requests. No answer was given at that time. The appearance of the committee at the executive office of the company followed our announcement of a 2-cent an hour raise in wages and a reduction from ten to six years in the period of service within which the maximum wage is reached. The committee returned on June 23 and asked if we would arbitrate as provided in our franchise. The members were assured that we would do so, and we were immediately called upon by a second committee, with written demands for the very arbitration to which we had already consented.

"The matters in question are requests for a shorter day and a higher rate of pay per hour, together with a guaranteed wage for extra men, and the reinstatement of several suspended men. The request that the suspended men be reinstated was acted upon as soon as it was decided that arbitration would be granted.

### COMPANY REALIZES CHANGED CONDITIONS

"The company has always stood behind its loyal men, and these men can depend upon us to continue to stand behind them. We realize that living conditions have changed and we have done what we could to help meet those changed conditions by making three wage increases in six months. In addition to the wages paid, we give free tickets to trainmen and their families, the latter provision being extremely unusual. The increases announced have added more than $140,000 to our annual payroll. All equipment and material that we use costs us from 50 per cent to 450 per cent more than it did before 1914, but we are still furnishing 7 and 8-cent rides for the same nickel, a nickel that has shrunk to 2½ cents in its diminished purchasing power.

### MAKING A POLITICAL ISSUE OF THE COMPANY

"We have been harrassed, embarrassed and annoyed in every conceivable manner by those who have sought to make a political issue of this company. Unfair and illegal competition has been permitted with a view to crippling us financially, but we have continued to work under these handicaps, believing that ultimately a sense of fair play and justice will prevail in this community."

It is understood that the shop men in the employ of the company are to be taken into the union. The requests with respect to the shop men, tentatively agreed upon, are an eight-hour day in all cases and an advance from the present pay of $2.75 a day to $3.50, and $4 a day in case of machinists.

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# Terminal for Los Angeles

## California Railroad Commission to Consider Matter of a Union Passenger and Freight Railroad Terminal

The question of establishing a union passenger and freight railroad terminal in Los Angeles will be considered by the Railroad Commission of California sitting *en banc* in Los Angeles on July 24. The Supreme Court of the State recently gave the commission undisputed jurisdiction over railroad crossings, both within and without incorporated municipalities. This jurisdiction had been opposed by the Los Angeles city attorney, who claimed that while the commission had complete authority over union terminals in Los Angeles, it did not have control of grade crossings within that city.

The decision has eliminated the opposition and the commission has promptly laid plans for complete investigation of the demands which are being made for the consolidation of Los Angeles railroad terminals. The case carries with it both freight and passenger service, includes all steam roads entering Los Angeles, and the question of how crossings shall be protected throughout the city. The case is formally known as the complaint of the Municipal League, the Central Development Association and the Civic Center Association of Los Angeles, and the cities of Pasadena, Alhambra, San Gabriel and South Pasadena against the Southern Pacific, the Pacific Electric, the Santa Fé and the Salt Lake Railroads.

The applicants have asked the commission to require the railroad companies to build a union terminal, and to reconstruct their tracks running to and from the terminal so as to eliminate grade crossings, which are the cause of death and injury.

## Dayton Strike Settled

The sixty-six striking motormen and conductors of the Dayton (Ohio) Street Railway returned to work on June 28, after a conference with W. A. Keyes, president of the company, and W. L. Smith, general manager, and Mark Crawford, representing the Department of Labor. Chris Cline, who organized the local branch of the union among the men, joined with the executive committee in recommending a settlement. The terms of the settlement were not made public, but it has been stated that the company agreed to meet and deal with committees appointed by the union in case of disagreements, without a formal recognition of the organization. Apparently both sides made concessions. The strike was called on June 16 after the company had refused to recognize the union and yield to some other demands.

## Berkshire Strike Conference

A conference was held at Springfield, Mass., on July 2 between representatives of the employees of the Berkshire Street Railway and President L. S. Storrs regarding wage conditions. C. Q. Richmond, general manager of the company, was also in attendance. Union representatives have threatened a strike on this property unless the demands of the men now before the management are granted. The company has offered substantial increases and has asked for sufficient time to allow it to apply to the Public Service Commission of Massachusetts for an increase in fare. At the conference the hope was expressed that the company and the men might be able to come to terms without a strike. No statement was made as to the result of the conference, except that it was agreed among the parties that further consideration of the wage question would take place at Pittsfield later in the week through conference with Mr. Richmond.

**Lake Shore Advances Wages.**—Motormen and conductors on the Lake Shore Electric Railway, Cleveland, Ohio, have been granted a voluntary advance in wages of 2 cents an hour. The minimum has been advanced from 27 cents to 29 cents and the maximum from 33 cents to 35 cents. Other employees received a proportionate increase.

**Franchise Approved in East Cleveland.**—The City Council of East Cleveland, Ohio, has approved a twenty-five-year franchise to the Cleveland Railway with a rate of fare of 5 cents in cash or six tickets for a quarter for passengers traveling to and from Cleveland, and 3 cents within the limits of East Cleveland. The franchise will be submitted to a referendum vote on July 31, and if it is approved will become effective at once. The company is to pave its portion of the streets, extend the Superior Avenue line to Euclid Avenue and build a crosstown line.

**Strike Settled in Steubenville.**—Motormen and conductors reached an agreement with the Steubenville, Wellsburg & Weirton Railway, Steubenville, Ohio, on June 30, after having been on a strike for two weeks. They accepted an increase in wages of from 2 cents to 4 cents an hour, with a maximum of 34 cents an hour, although they had demanded 40 cents an hour. W. L. Chambers, federal mediator, spent some days in an endeavor to bring about a settlement, but left for Washington on June 28, after apparently exhausting all efforts. Cars were not operated during the strike.

**Increase in Wages in Lexington.**—An increase of 1½ cents an hour in wages paid the motormen and conductors of the city and interurban lines of the Kentucky Traction & Terminal Company, Lexington, Ky., became effective on July 1. The increase is the result of the operation of the co-operative plan agreed on a year ago between the company and its employees. Under this agreement a percentage of the gross earnings is placed in a fund from which the expense of maintenance and damage claims are paid and the balance distributed in increased wages to the men.

**Municipal Railway Favored in Lincoln.**—Citizens of Lincoln, Ill., have expressed themselves overwhelmingly in favor of a municipal street railway for the city. At a recent election a bond issue of $30,000 was voted, the proceeds of which will be used to purchase the old railway plant of the Lincoln Railway & Heating Company, which has been idle for a number of months, and to rehabilitate the same and place it in operation. The property lost money as a private venture and after disagreement with the Council of Lincoln the State Public Utilities Commission authorized the company to suspend operations.

**Franchises Surrendered for Commission Permits.**—The Louisville & Southern Indiana Traction Company, the Louisville & Northern Railway & Light Company, together with the United Gas & Electric Company, serving a number of communities in southern Indiana opposite Louisville, have served notice that they are surrendering city franchises in the towns in which they operate and will hereafter operate under direction of the Indiana Public Service Commission. The city railway service in New Albany and Jeffersonville will continue as at present and the county franchises will not be given up, for the time being.

**Wage Conferences Continue in Rhode Island.**—Conferences between representatives of the car men's union and officials of the Rhode Island Company, Providence, R. I., are continuing, almost every day, and a new agreement to take the place of the one which ended on May 30 is likely to result. The document submitted by the union is a lengthy one, and it is being argued section by section. A tentative schedule for the platform men has been reached by the conferees, who are now engaged in working out a new scale for the men in the mechanical departments. By mutual agreement the old contract remains in force until a new one is adopted. Any increase will date back to June 1.

**Another New York Subway Connection Opened.**—The Interborough Rapid Transit Company, New York, N. Y., on July 1 put in service the new West Farms subway connection between the Second and Third Avenue elevated railroads in the Bronx and the West Farms branch of the first subway. The connection extends through private property, Willis and Bergen Avenues, from 143d Street to the elevated portion of the subway. Actual operation began on July 2 under direction of the Public Service Commission for the First District when some twenty Second Avenue elevated express trains originating at Freeman Street were placed in service by this route. The new connection will relieve congestion at the 149th Street elevated station.

**Increase in Pay in Denver.**—Trainmen employed by the Denver (Col.) City Tramway have voted to accept the company's offer of an increase in wages of 3 cents an hour. About 900 men are affected by the raise in pay. The vote to accept the offer was taken at a meeting held on June 24. This offer was made by the company several weeks ago, along with an offer of a similar increase in all other departments. Employees in other branches accepted, but action was deferred by the trainmen. The decision to accept means that $102,000 will be added to the annual expense of the tramway. The Denver men have a brotherhood of their own. Some time ago the men, through the brotherhood, appointed a committee to confer with the officers of the company with respect to wages.

**Increase in Wages in Tacoma.**—The Tacoma Railway & Power Company, Tacoma, Wash., and the Pacific Traction Company, operated by Stone & Webster, under the supervision of the Puget Sound Traction, Light & Power Company, Seattle offices, announced that the following scale of wages would become effective on July 1 for the trainmen of these companies: Passenger and freight motormen and conductors, first six months, 26 cents an hour; second six months, 27 cents; second year, 28 cents; third, 29 cents; fourth, 30 cents; fifth, 31 cents, and sixth year and thereafter, 33 cents. Freight brakemen: 27 cents; one-man car operators, in addition to above scale, 2 cents; gripmen, in addition to above scale, 1 cent. The trainmen's wage scale which went into effect on June 1 was as follows: First year, 25 cents; second, 26 cents; third, 27 cents; fourth, 28 cents; fifth and sixth, 29 cents; seventh and thereafter, 31 cents. Additional amounts were granted for gripmen, student instructors and one-man car operators. The employees of the Tacoma Railway & Power Company and the Pacific Traction Company have received three increases in pay since Dec. 1, 1916. The second increase was granted on June 1, this year.

# Financial and Corporate

## Annual Reports

### Lake Shore Electric Railway System

The comparative income statement of the Lake Shore Electric Railway System (comprising the Lake Shore Electric Railway, the Lorain Street Railroad, the Sandusky, Fremont & Southern Railway, the People's Light & Power Company, and the Bellevue Illuminating & Power Company) for the calendar years 1916 and 1915 follows:

| | 1916 | | 1915 | |
|---|---|---|---|---|
| | Amount | Per Cent | Amount | Per Cent |
| Gross income | $1,618,551 | 100.00 | $1,387,143 | 100.00 |
| Operating and taxes | 1,022,712 | 63.20 | 898,136 | 64.70 |
| Net | $595,839 | 36.80 | $489,007 | 35.30 |
| Interest paid | 436,647 | 26.96 | 433,202 | 31.25 |
| Surplus | $159,192 | 9.84 | $55,804 | 4.05 |

According to the foregoing table, the gross income of the whole system in 1916 increased $231,408 or 16.6 per cent. The operating expenses and taxes rose $124,576 or 13.9 per cent, so that the net gained $106,832 or 21.8 per cent. Interest showed a slight increase, but the surplus for the year was almost tripled.

The gross earnings of the Lake Shore Electric Railway, the largest one in the system, increased $155,192 or 14.14 per cent in 1916, this comparing with a decrease of $23,286 or 2.07 per cent in 1915. In 1916 the passenger revenues rose $122,065 or 13.5 per cent, and the freight revenue $26,418 or 23.4 per cent. The operating expenses and taxes in 1916 increased $84,540 or 11.7 per cent. This company expended $63,694 out of the total of $72.113 for additions and improvements in 1916.

Miscellaneous statistics for the various parts of the system follow:

LAKE SHORE ELECTRIC RAILWAY

| | 1916 | 1915 | Increase |
|---|---|---|---|
| Operating ratio (per cent) | 64.18 | 65.55 | *1.37 |
| Car-miles | 3,518,305 | 3,361,869 | 156,436 |
| Income per car-mile (cents) | 35.59 | 32.63 | 2.96 |
| Oper. and taxes per car-mile (cents) | 22.84 | 21.39 | 1.45 |
| Net earnings per car-mile (cents) | 12.75 | 11.24 | 1.51 |
| Passengers carried | 5,768,899 | 5,210,750 | 558,149 |
| Earnings per passenger (cents) | 18.00 | 17.57 | 0.43 |

LORAIN STREET RAILROAD

| | 1916 | 1915 | Increase |
|---|---|---|---|
| Operating ratio (per cent) | 62.90 | 69.34 | *6.44 |
| Car-miles | 676,683 | 559,678 | 117,005 |
| Income per car mile (cents) | 30.35 | 26.83 | 3.52 |
| Oper. and taxes per mile (cents) | 19.09 | 18.60 | 0 49 |
| Net earnings per car mile (cents) | 11.26 | 8.23 | 3.03 |
| Passengers carried | 3,563,829 | 2,543,530 | 1,020,299 |
| Earnings per passenger (cents) | 5.76 | 5.90 | *0.14 |

SANDUSKY, FREMONT & SOUTHERN RAILWAY

| | 1916 | 1915 | Increase |
|---|---|---|---|
| Operating ratio (per cent) | 66.22 | 71.50 | *5.28 |
| Car-miles | 237,849 | 229.781 | 8,068 |
| Income per mile (cents) | 39.00 | 33.37 | 5.63 |
| Oper. and taxes per mile (cents) | 25.81 | 23.86 | 1.95 |
| Net earnings per car mile (cents) | 13.19 | 9.51 | 3.68 |
| Passengers carried | 337,602 | 299,746 | 37,856 |
| Earnings per passenger (cents) | 25.54 | 24.29 | 1.25 |

*Decrease.

### Honolulu Rapid Transit & Land Company

The outstanding feature of the operations of the Honolulu Rapid Transit & Land Company, Honolulu, T. H., for 1916 was the growth in traffic over the whole system. The passenger revenue increased from $575,583 in 1915 to $641,054 in 1916, an amount of $65,471 or 11.4 per cent. This was an increase of nearly $45,000 over the passenger revenue of any other year of operation. The freight revenue in 1916 rose from $9,350 to $13,440, and these increases with other slight changes made a total increase of $69,332 in the revenue from transportation. The gross revenue from operation at $669,981 showed an increase of $70,417 or 11.8 per cent.

The operating expense total for 1916 was $355,435, while that for 1915 was $372,411. Thus the expenses for the last year decreased $16,975 or 4.5 per cent. This decrease arose from decreases in maintenance of way and structures, traffic, and general and miscellaneous, with increases in the maintenance of equipment and conducting transportation. The net revenue from operation at $314,546 represented an increase of $87,392. This was cut somewhat by an increase of $30,268 in deductions, so that the net income for the year at $84,313 showed an increase of $57,124.

During 1916 there was expended on account of additions to plant the sum of $27,664. Various comparative statistical data follow:

| | 1916 | 1915 |
|---|---|---|
| Average fare per revenue passenger | $0.0486 | $0.0488 |
| Average expenses per fare passenger | 0.0264 | 0.0310 |
| Revenue from transportation per car mile | 0.3208 | 0.2955 |
| Revenue from transportation per car hour | 3.0230 | 2.7480 |
| Operating revenue per car mile | 0.3277 | 0.3020 |
| Operating revenue per car hour | 3.0870 | 2.8090 |
| Operating expenses per car mile | 0.1738 | 0.1876 |
| Operating expenses per car hour | 1.6380 | 1.7450 |

### Washington Railway & Electric Company

The comparative income statement of the Washington Railway & Electric Company, Washington, D. C., and its subsidiaries for the calendar years 1915 and 1916 follows:

| | 1916 | | 1915 | |
|---|---|---|---|---|
| | Amount | Per Cent | Amount | Per Cent |
| Gross earnings from operation | $5,539,465 | 99.5 | $5,191,627 | 99.6 |
| Miscellaneous income | 27,509 | 0.5 | 22,328 | 0.4 |
| Gross income | $5,566,975 | 100.0 | $5,213,955 | 100.0 |
| Operating expenses (including taxes and depreciation) | 3,280,486 | 58.9 | 3,009,071 | 57.7 |
| Gross income less operating expenses | $2,286,489 | 41.1 | $2,204,884 | 42.3 |
| Fixed charges | 1,194,035 | 21.5 | 1,187,997 | 22.8 |
| Surplus income | $1,092,454 | 19.6 | $1,016,887 | 19.5 |

The gross earnings from operation during 1916 showed an increase of $347,838 or 6.7 per cent, owing to the greater activity in the national capital. Miscellaneous income also increased, but the combined gain was cut to quite an extent by the advance of $271,414 or 9 per cent in operating expenses, taxes and depreciation. The expenditure for maintenance and depreciation in 1916 totaled $955.161. as compared to $921,939 in the year preceding. The fixed charges in 1916 showed a small increase, and the net result for the year was an increase of $75,567 or 7.4 per cent in the surplus income.

The expenditures for construction in 1916 amounted to $832,835, the largest sum since 1912. During the year the cars of the system traveled 11,013,409 miles and carried 90,035,285 passengers, of whom 21,489,744 were free transfer passengers. The average fare per revenue passenger was 4.2887 cents, and the average fare per passenger was 3.2397 cents. The last figure has remained practically constant for sixteen years, in spite of extensions, improvements and higher costs. It would seem that the time has come, the annual report says, when a spirit of fair dealing would suggest that a 5-cent fare is deserved if the system is to be maintained on a scale worthy of the capital.

### Delaware & Hudson Electric Lines

The annual report of the Delaware & Hudson Company for the calendar year 1916 states that the revenues of the electric railways in which it is interested were somewhat better during 1916 than during 1915, but that they did not, on the whole, recover sufficiently to regain the level of 1914.

In comparison with 1915, the total operating revenues of the United Traction Company, Albany, N. Y., increased $79,346 in 1916. but were still lower by $55,292 than the total of 1914. The net operating income was $64,417 higher than in 1915, but $241,667 less than in 1914. It is said that the reduced net corporate income of this company (due to (a) the diminished use of its facilities by the public; (b) heavily increased operating expenses resulting from high wages and high prices of materials and supplies, and the reconstruction of equipment compelled by the Public Service Commission, and (c) greatly augmented taxation) has produced a condition which should not be permitted to continue. In speaking of the general strike during Oct. 2-4 in which the arbitration award sustained the company officials, the report states that the wages sacrificed by the employees amounted to about $4,616 and the direct cost of the strike to the company approximated $5,666.

Compared with 1915, the 1916 operating revenues of the Hudson Valley Railway, Glens Falls, N. Y., increased $60,955, and the increase over 1914 was $10,634. Operating expenses decreased $2,428 below 1915, but exceeded 1914 by $8,606. The net operating income, therefore, was $63,604 more than in 1915, and $839 more than in 1914. The 1916 operating revenues of the Plattsburg (N. Y.) Traction Company exceeded those of 1915 by $6,688 and those of 1914 by $4,712. The operating expenses amounted to $2,707 more than in 1915 and $2,462 more than in 1914, while the net operating income was $3,811 greater than in 1915 and $1,983 greater than in 1914. The 1916 operating revenues of the Troy & New England Railway, Troy, N. Y., increased $1,671 over 1915, but were still $889 less than in 1914. The operating expenses decreased $775 as compared with 1915, but exceeded those of 1914 by $4,644, so that the net operating income increased $2,274 over 1915, but fell $5,624 below those of 1914.

## Consolidation Plan at East Liverpool

Application has been made to the Ohio Public Utilities Commission to consolidate the Steubenville & East Liverpool Railway & Light Company, the East Liverpool Traction & Light Company, and the Ohio River Passenger Railway, under the name of the Steubenville, East Liverpool & Beaver Valley Traction Company. The light plants in East Liverpool, Wellsville and Chester, W. Va., are to be sold to a new corporation, the Buckeye Power Company, for which authority is also asked in the application. Temporary directors of this company are B. J. Jones, F. A. Boutelle, A. G. Lee, Paul R. Bowles and J. B. McCullough. The properties are now operated under lease to the Ohio River Power Company. This, it is said, will be continued.

The new railway company will have a capital stock of $9,900,000, as compared with $14,000,000, the combined capital stocks of the old companies. It is also said that there will be a readjustment of the outstanding bonds. The consolidated lines connect Steubenville, Wellsville and East Liverpool, Ohio, and Midland, Pa. The company will also operate the bridge across the Ohio River at East Liverpool.

## C., D. & M. Reorganized

### Statement of Capitalization of Successor Company—New Securities Approved by the Ohio Public Utilities Commission

The sale of the Columbus, Delaware & Marion Railway to the Columbus, Delaware & Marion Electric Company was confirmed by Judge E. B. Kinkead at Columbus, Ohio, on June 28. The property was purchased at receiver's sale for the new company on June 11 by Ralph H. Beaton for $417,494, subject to the certain mortgages and other claims.

The new company will have outstanding issues: $1,900,000 of 5 per cent bonds; $650,000 of 7 per cent preferred stock and $700,000 of common stock. The bonded debt of $1,900,000 will include $1,533,000 of underlying bonds and $367,000 of first and refunding mortgage bonds of the new company. The reduction in the capitalization of the new company as compared with the old is $2,203,000. All of the new securities, including the common stock, have been approved by the Ohio Public Utilities Commission. The total authorized issue of preferred and common stocks is $1,000,000 each.

Eli M. West, who served as receiver of the old company, will be president and general manager of the new company. Among the directors will be Mr. West, H. J. Catrow, Miamisburg, Ohio; Earl Turner, Dayton, Ohio, and J. J. Bodell and L. C. Gerry, both of Bodell & Company, Providence, R. I.

The Columbus, Delaware & Marion Electric Company operates 60 miles of standard gage electric railway connecting Columbus, Worthington, Delaware, Prospect, Radnor and Marion and also operates the city railway service in Marion and Delaware. In addition it furnishes electric light and power in the city of Marion and energy to the Prospect Electric Light & Power Company and the Columbus, Marion & Bucyrus Railroad. It owns Glenmary Park and its railway lines serve Olentangy Park in North Columbus.

## C., D. & T. Property Sold

The property of the Cincinnati, Dayton & Toledo Traction Company was sold at receiver's sale in Cincinnati, Ohio, on June 30 to the bondholders' protective committee at the upset price of $400,000, subject to the underlying bonds. The property was appraised at $2,900,000 and was ordered sold by the Common Pleas Court at a price not less than two-thirds the difference between the appraisement and the equity of the underlying bonds, amounting to $2,300,000. The difference was $600,000, so the price received was exactly the minimum amount. The bondholders' protective committee, which represented about $2,500,000 of the $2,700,000 of consolidated mortgage bonds of the Cincinnati, Dayton & Toledo Traction Company, consists of James M. Hutton, Cincinnati, chairman; Otto Armleder, Leo J. Van Lahr, Edgar Friedlander and Claude Ashbrook.

For some time the road has been operated by the Ohio Electric Railway in connection with its properties. When the sale has been approved it is probable that the committee will endeavor to make some arrangement by which this connection can be continued. If this cannot be done, a new company may be organized to operate it. The line extends from Spring Grove Avenue, Cincinnati, to Dayton, with a branch between Miamisburg and Germantown.

## Securities' Association Officers

### S. Davies Warfield, President—Several Electric Railway Men on Executive Committee

The officers and executive committee of the National Association of Owners of Railroad Securities, organized on May 23, at a conference held in Baltimore, for the purpose of stabilizing the securities of the carriers by maintaining their credit, were announced on June 30, as follows:

President, S. Davies Warfield; vice-president, Eastern district, Forrest F. Dryden, president Prudential Insurance Company of America; Southern district, T. K. Glenn, president Atlantic Steel Company and a director of the Georgia Railway & Power Company; Central district, John J. Mitchell, president Illinois Trust & Savings Bank; Western district, Charles C. Moore of Charles C. Moore & Company, Inc., engineers, and president Panama-Pacific International Exposition; Southwestern district, I. H. Kempner, president Texas Bank & Trust Company; treasurer, J. Hough Cottman of J. H. Cottman & Company, Baltimore, Md.

Executive committee: S. Davies Warfield, chairman; Charles F. Adams, Boston, Mass.; John T. Baxter, Minneapolis, Minn.; Louis F. Butler, Hartford, Conn.; James E. Caldwell, Nashville, Tenn.; Walter F. Coachman, Jacksonville, Fla.; David R. Coker, Hartsville, S. C.; F. H. Ecker, New York, N. Y.; Crawford H. Ellis, New Orleans, La.; Jacob Epstein, Baltimore, Md.; Henry Evans, New York, N. Y.; William M. Hayden, Baltimore, Md.; Robert Jemison, Sr., Birmingham, Ala.; George K. Johnson, Philadelphia, Pa.; F. J. Kell, Wichita Falls, Tex.; Darwin P. Kingsley, New York, N. Y.; Harold Kountze, Denver, Col.; George C. Markham, Milwaukee, Wis.; Henry A. Page, Aberdeen, N. C.; Walter J. Raymer, Chicago, Ill.; Henry A. Schenck, New York, N. Y.; Henry T. Scott, San Francisco, Cal.; A. L. Shapleigh, St. Louis, Mo.; John G. Walker, Richmond, Va.; Clarence W. Watson, Fairmont, W. Va.; John F. Wilkins, Washington, D. C.; Ernest Woodruff, Atlanta, Ga.; Clifford B. Wright, Cincinnati, Ohio.

Mr. Shapleigh, St. Louis, is a director of the United Railways of that city, and C. W. Watson, Fairmont, W. Va., is a director of the Monongahela Valley Traction Company.

**Chicago City & Connecting Railway, Chicago, Ill.**—A semi-annual dividend of $1.50 a share has been declared on the preferred participation certificates of the Chicago City & Connecting Railway, payable on July 1 to holders of record of June 23. This compares with $2.25 a share paid in January last.

**Cleveland (Ohio) Railway.**—The statement of operation of the Cleveland Railway for May shows a net surplus of $30,794, which goes to the interest fund, making a balance of $466,881 in the interest fund on June 1. There was a deficit of $26,369 in the operating fund due to an increase of 1 cent an hour in the wages of the men on May 1. A surplus of $6,974 in the maintenance fund reduced the maintenance deficit to $19,394. Accident claims cost the company $49,538 as compared with $34,961 for the corresponding month in 1916. The total number of riders for May was 34,409,231, an increase of 7.51 per cent over May last year. The total number of car-miles was 3,092,311, an increase of 7.31 per cent over the corresponding month of 1916.

**Duluth-Superior Traction Company, Duluth, Minn.**—The Duluth Street Railway, controlled by the Duluth-Superior Traction Company, has purchased the plant and 3-mile line of the Park Point Traction Company on Park Point, which is separated from the rest of the city by the ship canal. The deal was closed at a conference between A. M. Robertson, president of the Duluth Street Railway, and Robert R. Dunn, president of the Park Point Traction Company, in Duluth on June 26. President Robertson announced that his company would take over the operation of the line on July 1 and that a 5-cent fare with free transfer privileges to and from Park Point would go into effect on Sept. 1. The transfer privilege now costs 2 cents in addition to the 5-cent fare. The Park Point line cost $145,475 and there are outstanding $100,000 worth of income bonds and $14,000 worth of mortgage bonds issued in 1913. Mr. Dunn, the president, owned the controlling interest in the company. In 1916 the road was operated at a loss of $48.87.

**Jefferson County Traction Company, Beaumont, Tex.**—The City Commission of Port Arthur, Tex., has ordered an election to be held on July 10, at which the voters will pass on the franchise sought by the Jefferson County Traction Company, authorizing it to merge its properties with those of the Beaumont Traction Company and Beaumont Electric Light & Power Company, all controlled by the Eastern Texas Electric Company. The merger would simplify intercorporate relations.

**Ohio Electric Railway, Cincinnati, Ohio.**—The application of the Ohio Electric Railway for authority to issue $100,000 of equipment notes has been approved by the Public Utilities Commission. The company will purchase four motor express cars, sixteen flat trail cars and sixteen box trail cars at a cost of $130,000, the additional $30,000 being paid from the funds in the company's treasury.

**Orleans-Kenner Electric Railway, New Orleans, La.**—Application has been made for the appointment of a receiver for the Orleans-Kenner Electric Railway by J. D. Purcell, trustee, representing certain of the security holders. The indebtedness of the company to Bertron, Griscom & Company and the plans for local interests through which the road operates to take it over have been referred to in recent issues of the ELECTRIC RAILWAY JOURNAL. In referring to the receivership application the New Orleans *Item* said: "The receivership proceedings are apparently of a friendly nature, and intended to clear up the interurban's difficulties so that a sound method of financing the company may be instituted. Harry K. Johnson, promoter of the road, and Mr. Purcell are the chief owners of the bond issue of $250,000, the greater part of which stands pledged to Bertron, Griscom & Company, New York, for money advanced."

**Rochester, Syracuse & Eastern Railroad, Syracuse, N. Y.**—The plan of reorganization of the Rochester, Syracuse & Eastern Railroad dated May 18, 1917, prepared by the protective committee representing the holders of the first mortgage bonds, of which committee Arthur W. Loasby is chairman, was declared operative on June 21. A review of the terms of the proposed reorganization was published in the ELECTRIC RAILWAY JOURNAL of May 26, page 977.

**Western Ohio Railway, Lima, Ohio.**—Because of the expenditure of a considerable sum in the development of its light and power business and the great increase in the cost of fuel during the past six months, the holders of first preferred stock of the Western Ohio Railway were notified recently that the July dividend would be omitted. For the twelve months ended May 31, 1917, the company states that $74,713 remained after the payment of expenses, taxes and interest. This exceeds by a substantial amount the sum required to pay dividends on the first preferred stock. The capital expenditure in power development, however, was $34,336 this year compared with $7,166 last year, but the output of energy increased 18½ per cent. The cost of fuel increased $48,943 or 108 per cent.

## Dividends Declared

Athens Railway & Electric Company, Athens, Ga., quarterly, 1¼ per cent, preferred.

Cleveland & Eastern Traction Company, Cleveland, Ohio, quarterly, 1 per cent, preferred.

Columbia Railway, Gas & Electric Company, Columbia, S. C., quarterly, 1½ per cent, preferred.

Columbus, Newark & Zanesville Electric Railway, Springfield, Ohio, quarterly, 1½ per cent, preferred.

Georgia Railway & Power Company, Atlanta, Ga., 2¾ per cent, first preferred.

Monongahela Valley Traction Company, Fairmont, W. Va., 83⅓ cents, preferred; quarterly, 1¼ per cent, common; 1¼ per cent, common, extra.

Montreal (Que.) Tramways, quarterly, 2½ per cent.

National Properties Company, Philadelphia, Pa., 3 per cent, preferred; 2 per cent, common.

Northern Ohio Traction & Light Company, Akron, Ohio, quarterly, 1½ per cent, preferred.

Omaha & Council Bluffs Street Railway, Omaha, Neb., quarterly, 1¼ per cent, preferred; quarterly, 1 per cent, common.

Pine Bluff (Ark.) Company, quarterly, 1¾ per cent, preferred.

Rome Railway & Electric Company, Rome, Ga., quarterly, 1 per cent, common.

South Carolina Light, Power & Railways Company, Spartanburg, S. C., quarterly, 1½ per cent, preferred.

Springfield & Xenia Railway, Springfield, Ohio, quarterly, 1½ per cent, preferred.

United Gas & Electric Corporation, New York, N. Y., quarterly, 1¾ per cent, first preferred.

United Railways & Electric Company, Baltimore, Md., quarterly, 50 cents, common.

Virginia Railway & Power Company, Richmond, Va., 3 per cent, preferred.

West Penn Power Company, Pittsburgh, Pa., quarterly, 1¾ per cent, preferred.

York (Pa.) Railways, quarterly, 62½ cents, preferred.

Youngstown & Ohio River Railway, Leetonia, Ohio, quarterly, 1¼ per cent, preferred.

## Electric Railway Monthly Earnings

ATLANTIC SHORE RAILWAY, SANFORD, ME.

| Period | | Operating Revenue | Operating Expenses | Operating Income | Fixed Charges | Net Income |
|---|---|---|---|---|---|---|
| 1m., May, | '17 | $14,885 | $12,938 | $1,947 | $431 | $1.516 |
| 1 " " | '16 | 11,194 | 10,932 | 262 | 220 | 42 |

HUDSON & MANHATTAN RAILROAD, NEW YORK, N. Y.

| Period | | Operating Revenue | Operating Expenses | Operating Income | Fixed Charges | Net Income |
|---|---|---|---|---|---|---|
| 1m., May, | '17 | $523,146 | *$255,109 | $268,037 | $216,801 | $51,236 |
| 1 " " | '16 | 502,544 | *222,629 | 279,915 | 219,395 | 60,520 |
| 5 " " | '17 | 2,630,660 | *1,209,886 | 1,420,774 | 1,085,980 | 334,794 |
| 5 " " | '16 | 2,484,255 | *1,080,135 | 1,404,120 | 1,073,376 | 330,744 |

NORTHERN OHIO TRACTION & LIGHT COMPANY,
AKRON, OHIO

| Period | | Operating Revenue | Operating Expenses | Operating Income | Fixed Charges | Net Income |
|---|---|---|---|---|---|---|
| 1m., May, | '17 | $532,732 | $325,646 | $207,086 | $84,424 | $122,662 |
| 1 " " | '16 | 422,045 | 210,220 | 211,825 | 95,624 | 116,201 |
| 5 " " | '17 | 2,553,061 | 1,543,114 | 1,009,947 | 413,783 | 596,164 |
| 5 " " | '16 | 1,940,627 | 936,939 | 1,003,688 | 484,609 | 519,079 |

PHILADELPHIA & WESTERN RAILWAY, UPPER DARBY, PA.

| Period | | Operating Revenue | Operating Expenses | Operating Income | Fixed Charges | Net Income |
|---|---|---|---|---|---|---|
| 1 m., May, | '17 | $47,777 | $23,519 | $24,258 | $12,527 | $11,731 |
| 1 " " | '16 | 46,011 | 21,403 | 24,608 | 12,528 | 12,080 |
| 12 " " | '17 | 531,371 | 259,117 | 272,254 | 150,476 | 121,778 |
| 12 " " | '16 | 485,774 | 232,261 | 253,513 | 149,143 | 104,370 |

PORTLAND RAILWAY, LIGHT & POWER COMPANY,
PORTLAND, ORE.

| Period | | Operating Revenue | Operating Expenses | Operating Income | Fixed Charges | Net Income |
|---|---|---|---|---|---|---|
| 1 m., Apr., | '17 | $473,358 | *$260,594 | $212,764 | $183,824 | $28,940 |
| 1 " " | '16 | 447,967 | *250,968 | 196,999 | 181,537 | 15,462 |
| 12 " " | '17 | 5,617,994 | *3,048,517 | 2,569,477 | 2,182,930 | 386,547 |
| 12 " " | '16 | 5,458,798 | *3,065,985 | 2,392,813 | 2,203,132 | 189,681 |

TWIN CITY RAPID TRANSIT COMPANY,
MINNEAPOLIS, MINN.

| Period | | Operating Revenue | Operating Expenses | Operating Income | Fixed Charges | Net Income |
|---|---|---|---|---|---|---|
| 1m., May, | '17 | $841,764 | $531,928 | $309,836 | $149,942 | $159,894 |
| 1 " " | '16 | 849,056 | 515,264 | 333,792 | 145,206 | 188,586 |
| 5 " " | '17 | 4,322,748 | 2,865,833 | 1,456,915 | 730,414 | 726,501 |
| 5 " " | '16 | 4,156,224 | 2,631,142 | 1,525,082 | 713,387 | 811,695 |

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*Includes taxes.

# Traffic and Transportation

## New York State Fare Hearing

### Up-State Commission Discusses Procedure in Case of Twenty-eight Electric Railways Asking an Increase to 6-Cent Fare

The applications of twenty-eight electric railways of New York State, outside of New York City, for an increase in fare from 5 cents to 6 cents were taken up on July 6 by the Public Service Commission for the Second District. The first hearing was devoted to discussion regarding procedure. In opening the railways' case, Joseph K. Choate, chairman of the New York Electric Railway Association special committee on ways and means to obtain additional revenue, outlined the general financial troubles confronting the carriers. He then made the following proposal:

"We ask the commission to set down several days for the consideration of general questions. We ask that the commission set down three consecutive days in each of two weeks, at which time we will introduce proof relating to the rising costs of materials and labor; the effect of these increased costs upon operating expenses; the shrinkage in the purchasing power of a nickel; the decline in the net returns of these properties to their security holders; the gradual and serious impairment of the margin of safety for their bonds; the consequent increasing unattractiveness of electric railway securities to investors, and the extent to which the companies have failed to show an adequate return after making proper provision for maintenance, depreciation, surplus and contingencies.

"We propose to show further by affirmative proof that a 6-cent fare will increase the revenues of these companies, by introducing testimony as to the volume of traffic and the operating revenues of properties in other parts of the country where 6-cent fares have been allowed and charged.

"After this testimony has been submitted, we propose that each company shall, in such order as the commission may determine, present proof relating to its particular case; the financial results which it has achieved from operation; the return which has been secured upon the capital actually invested in the public service; the extent of the deficiency in its return, and the estimated earnings which would be produced with the proposed 6-cent fares."

## New York Passes Welsh Bill

### New Highway Traffic Law Is Very General in Its Application and Provides for Its Enforcement

One of the most important bills affecting street traffic, known as the Welsh bill, was passed recently by the New York Legislature and became effective on receiving the Governor's signature. It was the uniform traffic regulation act, proposed by the New York State Conference of Mayors and introduced in the Legislature by Assemblyman Clarence F. Welsh of Albany. The law is to be known as the general highway traffic law. It defines reckless driving as "driving or using a vehicle or street surface car or any appliance or accessory thereof in such a manner that it unnecessarily interferes with the free and proper ues of the highway or unnecessarily endangers users of the highway." The bill does not apply to the city of New York.

One of the provisions of the new law is that prohibiting automobiles from passing closer than 7 ft. from an electric railway car when passengers are alighting from or boarding the car. The police of Albany recently tried to enforce a similar provision of a city ordinance, but the automobile men fought the case in court and won out.

The law provides that during blockades a clear space of 10 ft. shall be maintained between street cars opposite any alley or the middle of the block if there be no alley. Subject to certain provisions pertaining to privileges of emergency and official vehicles, and except by order of a traffic officer, street cars shall have the right of way between cross streets over all other vehicles. Every electric railway car, by a signal approved by the Public Service Commission, shall warn all traffic in its rear of an intended stop or turning of the car. The driver of any vehicle proceeding upon the tracks in front of the car shall turn out as soon as possible upon signal of the motorman. The section of the law dealing with speed regulations specifies that electric railway cars shall be brought to a full stop and all other vehicles shall use extreme caution when approaching a crossing or place designated by signs as a traffic point. Local authorities are vested with power to designate by ordinance, rule or regulation the places at which such signs shall be placed.

The major portion of the law deals with regulation of motor vehicles in respect to right-of-way, signals, speed, safety zones, cab stands, and loading and unloading. When walking on the travel part of the streets and when meeting or passing vehicles, pedestrians shall obey the rules governing vehicles except as to signals.

Power is given to local authorities in cities to make, enforce and maintain reasonable ordinances and regulations governing traffic which the particular conditions make necessary. The law specifically states that it will be the duty of the members of the police department of every town or city to enforce the law strictly and impartially. The penalty for violating any provision is a fine not to exceed $10 for the first offense and not more than $25 for the second offense, or imprisonment for not less than two nor more than fifteen days. The third or any subsequent offense within one year shall be a misdemeanor and upon conviction may be punished by a fine not exceeding $100 or imprisonment not to exceed six months or both.

## Duluth Fare Case Settled

In consideration of the withdrawal of legal proceedings against the Duluth (Minn.) Street Railway to test the validity of the 10-cent fare charged for rides between Duluth proper and its western suburb, Morgan Park, the company has agreed to put a 5-cent fare into effect after Jan. 1, 1918, on all of its lines in the city with universal transfer privileges. The City Council on June 18 agreed to drop condemnation proceedings against the property, and the company consented immediately to construct the New Duluth extension of its Morgan Park line and to put the 5-cent fare, with universal transfers, into effect on Jan. 1, 1920, or sooner if the war ended. The compromise reached on June 18 was reviewed on page 1157 of the Electric Railway Journal for June 23. On July 2, when the company announced that it would put the 5-cent fare into effect next January, instead of two years later, the litigation was dismissed. A. M. Robertson, president of the company, in a statement made before the City Council said:

"The concessions which the company is making to meet the demands of the public are costly and the city officials should consider carefully any further requests for extensions, particularly at this time when the prices of material and labor are so high."

## More Skip Stops in Detroit

The Detroit (Mich.) United Railway on July 1 placed the skip-stop method of operation into effect on its Fort line. The company's weekly publication, *Electric Railway Service*, says that this form of express service on the Woodward and Jefferson Avenue lines, where it has been in operation for several months, is no longer an experiment and that the patrons on those lines, having become accustomed to the new method, would not change back to the old system. The poles along the Fort line have been painted to indicate the "car stop" corners, and measures have been taken to inform the patrons of the change, so that they may be inconvenienced as little as possible while the new system is being introduced. The skip stop on this line has been authorized for trial for a period of thirty days, and the company sees no reason why it will not prove satisfactory. The City Council has also authorized skip-stop operation on the Hamilton line, for which the stops are now being selected by the traffic bureau of the police department, and it is hoped to put it into effect about July 8.

**Fares Raised to 7 Cents.**—The Cumberland Railway, which connects Carlisle with Mount Holly and Newville, Pa., has increased its fare from 5 cents to 7 cents.

**Mobile Cab Drivers Must Have Bonds.**—As the result of the murder of a woman passenger by a taxicab driver, the city of Mobile, Ala., has passed an ordinance requiring all drivers of cabs, taxicabs, etc., to be bonded to the extent of $500.

**Uniform Signal System Recommended.**—At a recent discussion at Wheeling, W. Va., on the causes of accidents an official of the Baltimore & Ohio Railroad suggested the use of uniform signals by electric and steam railroads. Trainmen could thereby readily understand each other, which is highly desirable in cases of emergency.

**Lighter Uniforms for Portland Men.**—For the first time in its history the city of Portland, Ore., is presenting "shirtwaist" men as electric car conductors and motormen. The carmen of the Portland Railway, Light & Power Company have received permission to wear blue chambray shirts and light-weight blue trousers during the hot weather.

**Lehigh Valley Has Not Asked Increase.**—Contrary to recent reports in the press that the Lehigh Valley Transit Company, Allentown, Pa., had petitioned the Public Service Commission for permission to increase its fare from Allentown to Bethlehem from 10 cents to 15 cents, the company has no case pending, according to a statement by H. R. Fehr, president and general manager.

**Middlesex & Boston Hearing Continued.**—The second hearing on the petition of the Middlesex & Boston Street Railway, Newtonville, Mass., for authority to increase its fares was held on June 25, the day that the proposed increases were to go into effect. No decision was reached, and it is expected that several more hearings will be held. The commission has ordered that the effective date of the increase be postponed to Sept. 1.

**Skip Stop Agitated in Richmond.**—About 2500 people signed a petition which was presented to the Virginia Railway & Power Company, Richmond, asking that skip-stop operation be tried on Main Street. The petition was put before the City Council, but as yet has not received favorable consideration. Officials of the company say they are willing to give the plan a trial and, if it proves satisfactory, to put the skip stop in effect on all lines running into the suburbs.

**Ohio Coal Business Increases.**—Owing to the great demand for coal, the Hocking-Sunday Creek Traction Company of Athens, Ohio, has been engaged rather extensively in the transportation of that commodity and is preparing to increase its business. Ten mines have been opened along the line and the company is engaged in hauling the output to the steam railroads. Two additional cars were purchased recently to carry coal exclusively.

**Louisville Papers Encourage Traffic Rule.**—The papers of Louisville, Ky., are supporting editorially the recommendation of a committee of the Louisville Board of Trade that pedestrians on the downtown streets be required to cross streets only at established crossing places. One editorial states that "to forbid pedestrians to cross the crowded streets willy-nilly would not be a greater interference with individual liberty than their use of the streets is to drivers of vehicles."

**Publicity Talks in Pamphlet Form.**—The Union Electric Light & Power Company, St. Louis, Mo., which like the United Railways of St. Louis is controlled by the North American Company, has issued in pamphlet form a series of publicity talks which have appeared in the local papers in 1917. The statements were written by Frank Putnam. They deal in an interesting, frank way with rates, service, capitalization and other important phases of utility operation in which the public is interested.

**School for Motormen and Conductors.**—Thomas C. Moore, for many years a motorman and conductor on the local line of the Mahoning Valley Railway at Youngstown, Ohio, has been placed at the head of a school of efficiency for new men. Heretofore the new men were instructed by older employees, but in the future Mr. Moore will give them a thorough course of instruction before they are sent out on the road. He will then teach them the practical part of the work and remain with them until they are proficient.

**Inducing Discussions of Carelessness.**—The following paragraph is printed on the time-table folders of the Arkansas Valley Interurban Railway, Wichita, Kan.: "The management of the A. V. I. Railway requests the passengers on its trains to observe instances of reckless automobile driving near grade crossings, and when they get home to comment upon the instance at the family dinner table. In so doing they may save a life as effectually as the recipient of a Carnegie hero medal."

**Misuse of Transfers Results in Fine.**—Three residents of Cambridge, Mass., pleaded guilty on June 22 in the Cambridge District Court when charged with the improper use of transfer checks at the Central Square station of the Cambridge subway, a part of the Boston Elevated Railway. Each was fined $10. The defendants were William P. Clough, Charles E. Linton and Louis Kennon. One paid his fare with an old transfer check, another used a transfer check issued to him for a return ride, and the third used a check that had not been issued to him but had been obtained outside the station.

**Car Crews to Report Speeding Autoists.**—Thomas Lees, general superintendent of the Bay State Street Railway has issued an order to the employees calling to their attention the provisions of the law which prohibits automobile drivers from passing electric railway cars in a manner to jeopardize the safety of passengers while they are boarding or alighting. The law states that at such times a motor vehicle shall not approach within 8 ft. of the car except at points designated as safety zones or at the direction of a traffic officer. The conductors and motormen will report the license number of violators to the superintendent and he will make complaint to the police.

**Military Order Contested.**—In accordance with the military order respecting railroad trains on bridges across navigable streams, the windows of the Louisville-Jeffersonville and the Louisville-New Albany interurban cars are closed at the approaches to the bridges over the Ohio River. Passengers open them after the bridge is crossed. Since the middle of June, on account of higher temperatures and specially heavy traffic, passengers have made vigorous complaints. The same order is preventing the companies from using the open trailers heretofore used in the summer. Efforts have been made by officials of the Louisville & Southern Indiana Traction Company to obtain a withdrawal of the order, but thus far without success.

**Mileage System of Fares Adopted.**—The Western New York & Pennsylvania Traction Company, Olean, N. Y., has prepared a new schedule of rates which will become effective on July 18. The change is from the zone system of fare, now in use on all the company's interurban lines, to the straight mileage system. The rate per mile has been fixed at 3 cents, with a minimum charge of 6 cents. Commutation tickets will be sold as at present for rides between important points, and, in addition, regular 500-mile and 1000-mile mileage books will be sold at 2¾ cents per mile, good on all divisions for one year from date of purchase. The former fare charged was 7 cents. The company does not consider the change to be a rate increase since the new schedule will mean a decreased charge to many patrons. The cash fare registers used heretofore will also be eliminated and cash fare receipts adopted instead.

**Free Service to Soldiers a Burden.**—A. E. Potter, president of the Rhode Island Company, Providence, R. I., recently sent to Secretary of State Parker the company's reply to a resolution passed at the last session of the General Assembly requesting the company to give free transportation to the soldiers and sailors of the United States and the National Guard, while on duty. Mr. Potter wrote that the company was now carrying passengers at a loss; that the property was being operated at a loss, and that the deficit for four months of this year was $144,695. He said that in April of this year a deficit of $100,000 was shown. Mr. Potter also said that in other states no similar request was made, and that in Massachusetts the State paid the fares of its soldiers. Although there are but few troops in service in Rhode Island now, no doubt later there will be thousands, and to give free transportation to all these men would involve a very heavy expense. He said that the directors of the road had voted upon the question, and saw no reason why the company should furnish such service free.

# Personal Mention

**A. D. Mackie** has been elected a vice-president of the Springfield (Ill.) Consolidated Railway.

**S. W. Hatfield** has been appointed claim agent of the Macon Railway & Light Company, Macon, Ga., succeeding M. L. Corbett.

**Patrick J. Lucey**, Chicago, formerly attorney-general of Illinois, has been named a member of the Public Utilities Commission of that State by Governor Lowden.

**Duffy Bolls** has been appointed chief lineman for the Cincinnati, Milford & Loveland Traction Company with headquarters at Milford, Ohio, to succeed Edward Lawler.

**F. P. Gutelius** has been elected vice-president of the Schenectady (N. Y.) Railway to succeed C. S. Sims. Mr. Gutelius has succeeded Mr. Sims also as vice-president of the Delaware & Hudson Company at Albany, N. Y.

**H. L. Doherty** of H. L. Doherty & Company, New York, who has been vice-president of the Cumberland & Westernport Electric Railway, Cumberland, Md., has been elected president of the company to succeed Ferdinand Williams.

**M. G. Stratton** of Sanderson & Porter, engineers, New York, has been appointed general manager of the Shore Line Electric Railway, Norwich, Conn., effective July 1. Mr. Stratton succeeds W. C. Callaghan of the J. G. White Management Corporation, which had charge of the operation of the road during the past year.

**Howard A. Holmes** has returned to the Mahoning & Shenango Railway & Light Company, Youngstown, Ohio, as assistant electrical engineer. Mr. Holmes was formerly connected with that company in various capacities until about eight years ago. He was employed at the aeronautic station of the Pensacola navy yard before returning to Youngstown.

**J. B. Shickel** has been appointed superintendent and electrical engineer for the Menominee & Marinette Light & Traction Company, Menominee, Mich., to succeed J. C. Sprong. Mr. Shickel was graduated from Rose Polytechnic Institute, Terre Haute, Ind., in the year 1907. Since that time he has been with the General Electric Company at Schenectady, N. Y., first in the testing department and later in the special engineering and sales departments.

**H. J. MacDonald**, purchasing agent and storekeeper for the Spokane & Inland Empire Railroad, has resigned to accept the position of supply agent for the Copper River & Northwestern Railway at Kennecott, Alaska. Mr. MacDonald has been connected with the Spokane & Inland Empire for two and one-half years. Prior to that time he was employed in the purchasing departments of the Spokane, Portland & Seattle Railway and the Great Northern Railway. He will be succeeded at Spokane by E. E. Pike of the Oregon Electric Railway.

**Gresham Thomas**, for the last six years chief clerk in the purchasing department of the Georgia Railway & Power Company, Atlanta, Ga., resigned July 1 to become buyer for the Mill Power Company with headquarters at Charlotte, N. C. Mr. Thomas was employed as a wireman seventeen years ago by Ford, Bacon & Davis, engineers, who had charge of construction work on the Atlanta property. After two years in this work he was made clerk in the company storeroom and later served as storekeeper for several years. In his new position Mr. Thomas will have charge of the purchases, through the Mill Power Company, for the Southern Power Company and allied companies.

**W. O. Morgan**, New York, has been elected vice-president of the Buffalo, Lockport & Rochester Railway, Rochester, N. Y., to succeed F. A. Dudley. Mr. Morgan has been connected with electric railways for many years, during most of which time he was vice-president of the Sheboygan Railway & Electric Company, Sheboygan, Wis. He was also for a time an officer of the Greensboro (N. C.) Electric Company. Mr. Morgan was associated with Ernest Gonzenbach in handling finances and legal matters in connection with properties under the management of Mr. Gonzenbach and served with the latter when he was president of the Sheboygan Railway & Electric Company. Later, when Mr. Gonzenbach became manager of the Empire United Railways, Inc., Syracuse, N. Y., Mr. Morgan was made vice-president of the company. Mr. Morgan has contributed articles to the technical press, among which was a summary of the Public Utility Law of the State of Wisconsin.

**B. Waller Duncan**, general manager of the Cumberland & Westernport Electric Railway, Cumberland, Md., in addition to his other duties has been elected vice-president of the company succeeding H. L. Doherty. Mr. Duncan is a native of Missouri After he completed his education at one of the State normal schools he began railway work with the St. Joseph Railway, Light, Heat & Power Company operated by H. L. Doherty & Company and has been with the Doherty organization almost continuously since that time. He worked for seven years as a conductor, beginning under J. H. Van Brunt, who was at that time superintendent. Several promotions placed him in the position of trainmaster, which he held for four years and then resigned from railway service, but later returned to the St. Joseph Company. He accepted a position in a carhouse to add to his experience and in 1913 was recommended by Mr. Van Brunt, who had become general manager of all the Doherty properties in St. Joseph, for the position of superintendent of the City Light & Traction Company at Sedalia, Mo. The next step in his upward climb was made two years later when he became general manager of the Cumberland & Westernport Electric Railway, the position he still holds.

B. W. DUNCAN

## Obituary

**John A. Lafferty**, division superintendent of the Nashville Railway & Light Company, Nashville, Tenn., died recently at the age of fifty-three. Mr. Lafferty had been in the service of that company for twenty-seven years. He started as a motorman, but rose quickly to the position of division superintendent, which he held at the time of his death.

**C. G. Abercrombie**, a prominent citizen of Montgomery, Ala., died recently from a stroke of apoplexy. Mr. Abercrombie was the organizer and president of the Alabama Traction Company, which was formed several years ago, but has not yet completed its development work.

**H. O. Dwight**, organizer and first general manager of the Northampton (Mass.) Street Railway, died recently in Roselle, N. J. Mr. Dwight served in the Civil War and was on Sherman's march to the sea. From 1868 to 1900 he was treasurer of a missionary society, with headquarters at Constantinople. Among his most notable accomplishments was the translation of French-Turkish and English-Turkish dictionaries. For some years before his death he was secretary of the American Bible Society.

**James W. Crawford**, supervisor of claims of the Philadelphia (Pa.) Rapid Transit Company, died at Atlantic City on June 25. Mr. Crawford had been identified with electric railway claim department work for nearly twenty years. He began his career in this field as clerk in the claim department of the Milwaukee (Wis.) Electric Railway in 1898. In 1902 he was made claims agent of the International Railway, Buffalo, N. Y., and later was appointed comptroller and secretary of the company in charge of claims and accounting. In 1908 he resigned to become claims agent for the Chicago City Railway, where he remained until 1912, when he accepted the position of supervisor of claims of the Philadelphia Rapid Transit Company. Mr. Crawford had, in a rare degree, all of the qualifications essential to success in his chosen field. He was born in Maine in 1871 and spent his boyhood days in Minneapolis, Minn.

# Construction News

Construction News Notes are classified under each heading alphabetically by States.

An asterisk (*) indicates a project not previously reported.

## RECENT INCORPORATIONS

***Southwestern Utilities Company, Alva, Okla.**—Incorporated in Oklahoma to own, maintain and operate street railway and lighting properties in numerous Oklahoma cities and towns. Headquarters, Alva. Capital stock, $500,000. Incorporators: Albert Emanuel, president of the Kansas Electric Utilities Company, Dayton, Ohio, and Noel R. Cascho and W. A. Parr, Alva, Okla.

## FRANCHISES

**Los Angeles, Cal.**—The Railroad Commission of California has authorized the Pacific Electric Railway and the Southern Pacific Company to build and use jointly connecting tracks at Baldwin Park.

**Canton, Ohio.**—The Northern Ohio Traction & Light Company has accepted the city's franchise on Belden Avenue S. E. to Eighth Street and Belden Avenue N. E., to the Eighth Street corporation line N. E., and work on the extension will be begun as soon as possible.

**Cleveland Heights, Ohio.**—The Cleveland Railway accepted the franchise granted it by the City Council of Cleveland Heights on June 28. The present line on Cedar Road is to be extended to Lee Road, while the extension from Coventry Road to Lee Road must be completed within five years. A portion of the extension work will be done this year.

**Northampton Heights, Pa.**—The Easton Transit Company has received a franchise from the Town Council of Northampton Heights to operate its cars on and over the tracks of the Lehigh Valley Transit Company on Hellertown Road from the Fourth Street bridge to the western borough line of Northampton Heights.

**Northampton Heights, Pa.**—The Lehigh Valley Transit Company has received a franchise from the Town Council of Northampton Heights to operate its cars on and over the tracks of the Easton Transit Company on Fourth Street, from the western borough line of Northampton Heights to the east end of the Fourth Street bridge. The company has also received a franchise to construct a second track on Fourth Street from Bessemer Street to the division line between the Borough of Northampton Heights and the Township of Lower Saucou.

**Dallas, Tex.**—The Dallas Northwestern Traction Company and the Dallas Southwestern Traction Company have asked the City Commission for an extension of three months' time on their franchises, agreeing to begin actual construction work on their proposed lines from Dallas to Slidell and from Dallas to Cleburne within this time. The companies propose that in lieu of the extension of the franchises for a period of three months, they would assume responsibility for any damage that might result from the construction of a viaduct across the Trinity River near Commerce Street. The companies asked this agreement instead of that originally planned, whereby they would deed to the city 14 ft. of the street where the viaduct was to be built. E. P. Turner, Dallas, president. [June 16, '17.]

**Seattle, Wash.**—The City Council of Seattle has been petitioned for a franchise for the construction of 2 miles of single-track railway to serve the Carleton Park addition, along Puget Sound, from Magnolia Bluff, by Arthur A. Phinney, David P. Eastman and R. V. Ankeny. The line would connect with the tracks of the Puget Sound Traction, Light & Power Company on Fifteenth Avenue West at Lawton Way viaduct, between Smith Cove and Interbay. It is proposed that the franchise expire on Dec. 31, 1934, the date of the expiration of the franchises of the Puget Sound Traction, Light & Power Company. It is assumed that this company is to furnish the service over the new line.

## TRACK AND ROADWAY

**Miami (Fla.) Traction Company.**—A report from the Miami Traction Company states that it will construct 1½ miles of new track at once, material for which has already been purchased.

**St. Johns Electric Company, St. Augustine, Fla.**—Work will be begun at once by the St. Johns Electric Company reconstructing its track in St. Augustine.

**Atlanta & Anderson Electric Railway, Atlanta, Ga.**—The Atlanta & Anderson Electric Railway, which proposes to build an electric line from Atlanta to Anderson, S. C., has filed a petition with the Railroad Commission of Georgia in which it asks to be allowed to issue $7,500,000 of common stock, $7,500,000 of preferred stock and $20,000,000 of bonds. It proposes to use the proceeds of these issues to build and equip its line from Atlanta to Anderson, the estimated length of the line being 140 miles, the estimated right-of-way being 100 ft. wide, and the equipment to consist of up-to-date electric locomotives, electric power cars, trail cars and other rolling stock. The towns and cities to be traversed by the line are Atlanta, Decatur, Chamblee, Doraville, Norcross, Duluth, Hoschton, Jefferson, Commerce, Royston and Anderson. The line will cross the Savannah River at a point near Brown's ferry. J. L. Murphy, Atlanta, is president. [April 28, '17.]

**Rome Railway & Light Company, Rome, Ga.**—The Railroad Commission of Georgia has ordered the Rome Railway & Light Company to pay one-third of the actual cost of the Fifth Avenue bridge over the Oostanaula River and Second Avenue bridge over the Etowah River, to lay tracks over the bridges and thereafter regularly operate its cars over the bridges on or before Aug. 1, 1917. The commission has also ordered that upon the completion of the Broad Street bridge over the Etowah River the company shall, upon similar terms and conditions, lay its tracks and operate cars over the bridge.

**Chicago (Ill.) Surface Lines.** — Announcement has been made by the Chicago Surface Lines that during the present year it will construct 20 miles of new track in addition to its regular program of track renewals.

**Chicago, North Shore & Milwaukee Railroad, Highwood, Ill.**—This company has been promised delivery of steel for the building of its extension to the tannery on North and Glen Flora Avenues by July 15.

**Northern Illinois Light & Traction Company, Ottawa, Ill.**—Work will be begun at once by the Northern Illinois Light & Traction Company, a subsidiary of the Illinois Traction System, improving its street car line and lighting system in Ottawa. It is estimated that the improvements will cost about $80,000.

**Rockford & Interurban Railway, Rockford, Ill.**—It is reported that the Rockford & Interurban Railway will make improvements in Freeport during the coming summer to cost approximately $25,000, providing the City Council grants it the right to extend its tracks on Mechanic Street from the present end of the line southward to Galena Street, where the company has leased a site for a new station.

**Iowa Railway & Light Company, Cedar Rapids, Iowa.**—This company reports that it has added 1½ miles of single track to its line in Marshalltown.

**Wichita-Walnut Valley Interurban Railway, Wichita, Kan.**—Right-of-way has been practically secured by this company from Wichita to Augusta, and work of grading will start within the next few weeks. Charles Payne, secretary. [May 19, '17.]

**Washington, Baltimore & Annapolis Electric Railway, Baltimore, Md.**—It is expected that this company will make extensive track improvements near Annapolis Junction for the army cantonment to be established there.

**Kensington (Md.) Railway.**—This company reports that when prices for material and labor are normal its proposed extension to Sandy Spring will be completed.

**Ironwood & Bessemer Railway & Light Company, Ironwood, Mich.**—A report from this company states that construction would be begun on July 1 on its proposed extension from Gile to Montreal, about 1½ miles.

**McComb & Magnolia Railway & Light Company, McComb, Miss.**—Announcement has been made by A. H. Jones, manager of the McComb & Magnolia Railway & Light Company that this company's proposed line to connect McComb, Magnolia and Summit will be constructed immediately. [April 29, '16.]

**Kansas City (Mo.) Railways.**—Work will soon be begun by the Kansas City Railways on the construction of its line on Eighteenth Street from Central to Kansas Avenue.

***Montana Power Company, Butte, Mont.**—Surveys have been begun for the construction of an electric railway and power line from Twin Bridges to the Bielenberg-Higgins and Lake Shore mines. The railway will be 14 miles long. The line will be built under the supervision of the Montana Power Company, but is to be the property of the Bielenberg-Higgins and Lake Shore mines, which will pay the cost of construction, estimated at $26,000. A high-tension line from Twin Bridges, carrying about 49,000 volts, will supply the power, but will be reduced to about 2000 volts at the Higgins mines and carried from there to the Lake Shore mines.

***Dillon, Mont.**—It is reported that a company is being organized to construct an electric railway from Dillon to Piedmont, via Twin Bridges, about 60 miles. A. J. Wilcomb, Twin Bridges, is reported interested.

**New York (N. Y.) Railways.**—The Board of Estimate has adopted the report of the franchise committee recommending the construction of a two-track surface railway through West Eighty-sixth Street from Central Park West to Broadway.

**Southern Public Utilities Company, Charlotte, N. C.**—An extension is being built by the Southern Public Utilities Company from Winston-Salem to Kernersville, 11 miles.

**Hillsboro, Cynthiana, Bainbridge & Chillicothe Traction Company, Hillsboro, Ohio.**—The Public Utilities Commisson of Ohio has approved the application of the Hillsboro, Cynthiana, Bainbridge & Chillicothe Traction Company to issue $400,000 of bonds, the proceeds of which are to be used in building its proposed line from Hillsboro to Chillicothe. J. C. Anderson, Chillicothe, secretary. [March 17, '17.]

**Muskogee (Okla.) Electric Traction Company.**—R. D. Long, general manager of the Muskogee Electric Traction Company, announces that he is prepared to build an interurban railway line from Tulsa to Henryetta and from Henryetta to Oklahoma City, with a branch line from Muskogee to Okmulgee. The line has already been financed, Mr. Long says, and actual construction work will begin as soon as he is able to get materials on the ground.

**Southern Pacific Company, Portland, Ore.**—The electric railway service in Albany has been discontinued by the Southern Pacific Company. According to its agreement with the City Council, when it was awarded the franchise, the company will have to remove the tracks and repair the street within a year from the discontinuance of service.

**Montgomery Transit Company, Philadelphia, Pa.**—This company reports that it has under consideration an extension from Harleysville to Soudertown, 4.3 miles, and from Harleysville to East Greenville, 12 miles.

**Stroudsburg, Water Gap & Portland Railway, Stroudsburg, Pa.**—Subject to the approval of the Public Service Commission of Pennsylvania, a new company, to be known as the Stroudsburg Traction Company, will lease and in future operate the Stroudsburg Passenger Railway and the Stroudsburg, Water Gap & Portland Railway. The new company will have a capital of $200,000 with a bond issue of $100,000, and an issue of $164,000 on the Water Gap Road will be assumed. The arrangement is expected to go into effect on Aug. 1. Physical connection between the two roads will be made during the fall and track connection will then be complete, with the exception of one grade crossing, from the Delaware, Lackawanna & Western Railroad passenger station in East Stroudsburg to Sixty-ninth and Market Streets, Philadelphia.

**Williamsport (Pa.) Passenger Railway.**—Surveys will soon be made for the construction of an extension of the Williamsport Passenger Railway from Third Street, Williamsport, to Newberry.

**Houston (Tex.) Electric Company.**—Plans are being contemplated by the Houston Electric Company for the construction of an extension to the coming National Guard mobilization camp west of the city. The extension will be about 1 mile, beginning at the western end of the West End line.

**San Antonio (Tex.) Traction Company.**—This company has under consideration the construction of an extension of its lines to South San Antonio, which would furnish transportation service to Camp Kelly, the aviation post.

**Salt Lake & Utah Railroad, Salt Lake City, Utah.**—Nearly all the grading has been completed and track laying is well under way on this company's 12-mile extension from Salt Lake City to Pleasant Green, via Chesterfield and Granger, and it is expected that the line will be ready for operation by the end of the summer.

**Yakima Valley Transportation Company, North Yakima, Wash.**—A report from the Yakima Valley Transportation Company states that it is now extending its Selah-Taylor line about 2½ miles.

**Seattle & Rainier Valley Railway, Seattle, Wash.**—This company reports that construction is under way on its Dearborn and Genesee Street extensions.

**Eastern Wisconsin Electric Company, Sheboygan, Wis.**—A proposed contract has been submitted by the Eastern Wisconsin Electric Company to the city of Oshkosh whereby it will spend between $200,000 and $250,000 on local improvements, provided the city will permit the elimination of certain unproductive track.

## SHOPS AND BUILDINGS

**Boston, Mass.**—Bids will be received by the Boston Transit Commission until July 12 for the wall finish of the Andrew Square and Broadway stations of the new South Boston tunnel, which is nearing completion.

**Kansas City (Mo.) Railways.**—It is reported that this company will build new car shops at Ninth Street and Lister Avenue.

**Hocking-Sunday Creek Traction Company, Nelsonville, Ohio.**—A report from this company states that it contemplates building a new carhouse.

## POWER HOUSES AND SUBSTATIONS

**Chicago, Milwaukee & St. Paul Railway, Chicago, Ill.**—Preparations are being made for the construction of the large substation to be erected in Tacoma in connection with equipping the Cascade division of the Chicago, Milwaukee & St. Paul Railway for electrical operation. The Tacoma station will furnish energy for the Tacoma yards and for the division between Tacoma and Seattle.

**Iowa Railway & Light Company, Cedar Rapids, Iowa.**—This company reports that it is installing a G.E. 500-kw, 600-1200-volt automatic substation, also a 2000-kw. G.E. automatic hydroelectric plant.

**Ottumwa Railway & Light Company, Ottumwa, Iowa.**—This company is installing a new 12,500-kw. capacity turbine generator unit.

**Bangor Railway & Electric Company, Bangor, Me.**—This company will extend its transmission line from Somerville to Southwest Harbor, 12 miles. Another line will be extended from Milford to Lincoln, 33 miles.

**City Light & Traction Company, Sedalia, Mo.**—This company plans to spend about $60,000 on improvements to its light plant on East Broadway, Sedalia. A 150-ft. stack will be erected and a new switchboard and new generating unit installed.

**Interborough Rapid Transit Company, New York, N. Y.**—A new one-story power plant, about 30 ft. x 60 ft., will be built by the Interborough Rapid Transit Company at 600 West Fifty-ninth Street. The structure will cost about $15,000.

**West Virginia Traction & Electric Company, Morgantown, W. Va.**—This company will increase the capacity of its local plant by the installation of a 1250-kw. turbo-generator unit, giving the plant a total capacity of 3500 kw. The generator will be moved from the plant of an affiliated company at Lebanon, Pa.

# Manufactures and Markets

Discussions of Market and Trade Conditions for the Manufacturer, Salesman and Purchasing Agent
Rolling Stock Purchases Market Quotations Business Announcements

## What Are Business Prospects for the Next Six Months?

### No Reduction in Prices Expected—Equipment Orders Are Small in Amount—Fair Increases May Bring Relief

Many divergent views are now obtainable on the business prospects for electric railway manufacturers during the last half of 1917. Never before have authoritative news and statistical estimates on business been sought so eagerly by the manufacturer or the railway operator. There are really no precedents by which business policies for the coming months can be determined, but there are many fundamental principles which do not change.

Recently a man of large business affairs in the Southwest, whose remarks are pertinent to any industry at this time, in addressing a representative gathering of salesmen on the subject of "Keep Business Going as a Patriotic Duty," had this to say about building operations: "Some people reason that lower prices will prevail later. I cannot understand how they arrive at this conclusion, because the change has come about by the decrease in the supply of almost everything and by the increase in the supply of money. So long as the war continues the number of producers will not increase, but, on the contrary, will continue to decrease. The demands in this country will increase by reason of our entering into the war; the labor supply will decrease; and, hence, the price of everything must increase."

### EQUIPMENT ORDERS ARE SMALL

Some manufacturers report a sharp falling off in electric railway inquiries, but state that their general business is fine because of increased sales in other fields. In the railway equipment section of the electric railway field, which is considered a good index for the entire field, the number of inquiries for the purchase of railway equipment is said not to have dropped off during the month of May as compared with April. However, the total value of the equipment covered by such inquiries was very much less in May than in April. In other words, the inquiries were for small quantities of equipment.

It is the opinion of some manufacturers that inquiries for the next few months will drop off materially. But, in explanation, it must be remembered that the summer months usually produce less inquiries for car equipment than do the spring and fall seasons. To quote one manufacturer: "Observations give me the firm impression that equipment buying generally is going to be pretty slow during this summer season, with the exception of here and there where pressure will demand additional service, due to activities in connection with supplying materials for war purposes."

### BOOST THE RAILWAYS' GAME

Most manufacturers express a hopeful view for their electric railway business. They recognize the conditions which have surrounded the operation of the properties, but in the future they see relief for the roads through reduced municipal burdens, increased fares and improved operating methods. Those manufacturers who really have the welfare of the electric roads at heart are sympathetically assisting in every consistent way to gain for the roads much-needed relief. And now that the increased fare campaign is in full swing in many cities it will behoove thoughtful manufacturers and their representatives to keep well informed on the news of progress being made before engaging in conversation with a railroad executive who also has the welfare of the industry at heart.

## Purchasing Agent and Salesman Co-operate

### Salesman Should Be Referred to Proper Department Heads—Frankness Will Cure the Long-Winded Salesman

By L. A. HALL
Purchasing Agent Fonda, Johnstown & Gloversville Railroad, Gloversville, N. Y.

I fully agree with the spirit of the article by W. McK. White on page 1031 of the June 2 issue of the JOURNAL. Two of the points touched on I think are of special interest, first, the purchasing agent who permits a salesman to assume his department has final decision on a definite deal, and second, "the long-winded salesman."

It is the duty of the purchasing agent to refer a salesman to the proper department in connection with the sale of any particular article in which the purchasing agent thinks his company may be interested. This is true especially where the practice is to have the head of the department pass on the merits of the article. There is nothing to be gained in trying to mislead the salesman. The purchasing agent knows the system followed in his own organization, the salesman may not; so we not only save our time but that of the salesman by putting him on the right road.

As regards the "long-winded salesman," why cannot this difficulty be taken care of by being open or frank with the salesman? If he happens to call when you are busy and you intend to give him an interview, why not do it? Come right out and let the salesman know you are busy; take up with him anything you have in mind and let him do likewise, but do not enter into conversation on subjects entirely foreign to your business. It takes two to start an argument, likewise a conversation. I believe a purchasing agent should give due consideration to the time of the salesman, and likewise the salesman with the purchasing agent. Nowadays, I do not think we have to worry much about the "peddler." They do not last long with their own employers, and while they do last the purchasing agent can put up with a little trouble. There are many things of interest to gather from the salesman and possibly vice versa. Our interests to some degree are dependent upon each other, so why not work together? Taking the thing as a whole, I think it can be boiled down to a "Be Brief" proposition.

## Deliveries on Fenders and Wheel Guards Fair

### Railways Anticipating Demands — Poor Freight Service and Crowded Mill Conditions Cause Many Delays—Car Designers Should Take Fenders Into Account

The manufacturer of fenders and wheel guards is affected by the raw material situation as are other specialty makers, but where orders are placed sufficiently in advance of actual requirements, no difficulty is experienced in meeting the demands for this equipment. In cases where fenders and wheel guards are ordered as soon as the car order is placed, the manufacturer can make deliveries by the time the car builder or railway company is ready to install them. Although stock has been ordered well in advance, it is practically impossible to get any reasonable delivery of freight shipments from mills, and this has caused embarrassment on several occasions. Again, malleable castings cannot be obtained from the foundries in less than four to six months, and this has necessitated delays in a number of deliveries.

The railways generally are now seeing the advisability of equipping cars with accessories that will give the maximum amount of protection. They are standardizing on a fender or wheel guard that has shown the highest efficiency under actual service conditions. Companies desiring to equip their entire systems many times do not care to make the entire investment at one time and therefore contract to equip two or three cars per month. This can be done at a very nominal cost, thus enabling them to equip their entire system probably within a year. Front-end protection was formerly looked upon only as being necessary to comply with the law, but the efficiency of proved devices has forced the railways to recognize the value of this protection. Front-end accidents in many instances have called attention to this condition, with the result that they are now considered just as important as accidents caused by people alighting from or boarding cars.

### Fenders Should Be Taken Into Account in Design of Car

When cars are designed the fender question should not be left to a point where it is said, "Now that the design is finished, where shall we hang the fenders?" The matter has often been put up to the fender people to try to adjust their equipment to suit the car. In some instances, very little clearance is given; in fact, many times clearances, etc., for fenders or wheel guards have been entirely overlooked. It is just as important to make provision for wheel guards or for the protection of the front end as it is to lay out platforms or any other part of the car. A good many railways have given careful consideration to this problem, and as a result of their co-operation the proper provision for front-end protection is thereby secured, giving the maximum form of protection to the public as well as to the railway.

## Co-operation Will Reduce Selling Costs

### Constructive Criticism Should Be Welcomed—Discussion of the Sore Spots Invited

The "safety first" attitude of salesmen toward customers is clearly illustrated in several communications recently received. One of these letters discussess the article on "Reducing the Selling Cost," by W. McK. White (on page 1031 of the June 2 issue). This letter illustrates the fact that a salesman will converse freely on the merits of his goods, but when the topic under discussion centers around possible deficiencies on the part of his customers, the salesman is not prone to talk freely. As one man puts it: "I have read this article with a great deal of interest and can say frankly that few of us have the courage to state this thing as positively as Mr. White has done in his article. I am inclined to agree with him in what he says about the waste of time and expense consumed in bringing to the attention of some electric railway companies the fact that they actually require certain materials."

Because this salesman, before entering his present line of work, successfully filled positions as the department head of a number of large roads, he can, when visiting properties, undoubtedly make good suggestions to the master mechanics. He probably sees the actual need of the road to make purchases of his and other salesmen's products. And when a master mechanic gets hold of a salesman of this sort he should pump him for every worth-while suggestion obtainable.

### Talking About the Other Fellow

Referring again to Mr. White's article, one sales manager has mentioned a factor that may contribute to the increase of the selling cost of most any article. He says: "It is a common tendency of electric railway men to consume the time of a salesman in endeavoring to secure information which usually is quite important to the railway company, but which is of no particular concern to the salesman. Such information has to do with the general condition of operation and the labor situation on other railway properties which the salesman visits. No doubt any salesman would be very glad to give this information freely, even at the sacrifice of the time necessary, providing the railway representative then showed his willingness to listen to the salesman tell his own story."

Successful salesmanship requires that characteristic which enables a man to speak out frankly and constructively, even though he may disagree with his possible customer. With this in mind, if there are in the electric railway sales field practices which are working hardships on both the buyers and the sellers, is it not to the best interests of the industry that they be discussed frankly by both parties? The recent articles by Mr. White and Mr. Horne in this department of the Electric Railway Journal have definitely set down some of these questions, and if the weaknesses are pertinent to the industry rather than to certain individuals, this paper will gladly assist by throwing its columns open for a frank discussion of how closer co-operation between the buyers and sellers may reduce the selling cost.

## Activity in Transmission Line Material Sales

### Manufacturer Gives Interview on Work in Central States—Railways Installing Branch Power Service—Forehandedness in Buying for 1918—Deliveries Cited

Transmission line materials are selling actively for installation in the central states, according to Max A. Berg, secretary of the Electric Service Supplies Company. The volume of business is not as great as it was six months ago, but still it is especially good. There is a scarcity of large projects, but the installation of branch power lines fed from railway transmission systems and the general expansion work of the existing high-tension transmission systems, combine to warrant the statement that this portion of the field is particularly active.

Some of the properties in the central states which have recently purchased transmission material include the Terre Haute, Indianapolis & Eastern at Terre Haute; Central Illinois Public Service Company; Ohio Electric Railway; Northern Ohio Light & Traction Company; Fort Wayne & Northern Indiana Traction Company; Iowa Railway & Light Company; Fort Dodge, Des Moines & Southern Railway, and the L. E. Myers Company of Chicago, which has recently made purchases for several of its associated properties.

According to Mr. Berg the deterring effect of high prices and slow material deliveries has largely been counteracted by the unusually large demand for power, so that orders are now being placed not only for substantial amounts of material but also for deliveries long into the future. Forehandedness in attention given by companies to the construction and maintenance demands of 1918 will reward many who are now looking that far ahead.

Mr. Berg states that the principal lines of material which his company manufactures for railway and other transmission line work are sharing about equally in the demand. These specialties include the Keystone steel triangle arm, metal truss pins and "never-creep" anchors. Deliveries on pins and metal arms even for large orders can now be made direct from stock if standard sizes are ordered.

Deliveries on high-tension porcelain are now quoted at four to six months, depending upon the design of the insulators, and according to Mr. Berg, if it had not been for the high prices of copper and the crowded condition of the porcelain factories, the 1917 high-tension transmission material business would have far exceeded all earlier records.

## Jamaica's Electrical Imports

American manufacturers furnish most of the electrical supplies and equipment used in Jamaica, according to a report recently received by the Bureau of Foreign and Domestic Commerce. There is no local manufacture of these products. The imports are grouped separately under two headings, as follows: (1) Apparatus necessary for generating, storing, conducting, converting into power or light and measuring electricity, and (2) telegraph and telephonic wire and apparatus. The imports of both groups fall under the list of articles admitted duty free.

During 1914 the imports of the first group amounted to $51,252 and in 1915 to $34,021, and the second group to $6,966 and $6,588 respectively. That the United States supplies such a large percentage of the electrical equipment imported into Jamaica may be attributed to the fact that in many instances the original installations consisted of American equipment.

## Export Trade Conference at Springfield, Mass.

A conference lasting one week, and devoted entirely to the problems of export trade, closed at Springfield, Mass., on June 30. Emphasis was laid upon the vital necessity of completely fulfilling specifications and promises to foreign purchasers, including shipments on dates agreed upon, and packing as required by foreign buyers. Much time was also given to reviewing credit facilities available through enterprising American banks. Among the speakers were J. W. Brooks, vice-president Pass & Seymour, Solvay, N. Y.; Fred S. Phillips, export manager American Ever Ready Works, Long Island City, N. Y.; and A. W. Gilbert, Chapman Valve Manufacturing Company, Indian Orchard, Mass.

Various points brought out in the conference may be touched upon. The United States needs export trade because it is the greatest producing nation and must have foreign outlets for surplus products or suffer the evils of glutted markets at home to the detriment of capital and labor alike. Patience is necessary in developing profitable foreign trade. Mushroom jobbers should be avoided. The government should foster co-operative efforts by competitive manufacturers seeking foreign outlets. We should freely accord long-time credits to foreign buyers. Foreign trade agencies are the eyes of export business. Relief from restrictive legislation is needed. Co-operation and standardization are also needed in American manufacturing plants to meet foreign competition, including uniform system cost accounting where possible.

## Large Circuit Breaker Order

The Interborough Rapid Transit Company, New York City, has ordered 505 Westinghouse carbon-break circuit breakers ranging in capacities from 1000 to 12,000 amp., including 196 600-amp. hand-operated breakers with overload trip, mounted on panels with 2400-amp. knife switches for the direct-current feeders; ninety-eight 12,000-amp. breakers for use with 4000-kw. rotary converters; fourteen 8000-amp. and forty-five 4000-amp. breakers for use with 3000-kw. and 1500-kw. rotary converters, and smaller sizes for equalizers and auxiliaries. This equipment had been ordered for use in new substations and in additions to the existing ones, made necessary by the 170 miles of subway and elevated extensions in New York City.

## ROLLING STOCK

**Tulsa (Okla.) Street Railway** has ordered six double-end, pay-as-you-enter, safety motor cars from the American Car Company, St. Louis, Mo., and has specified the following dimensions and equipment:

| | |
|---|---|
| Seating capacity | 34 |
| Length over bumpers | 27 ft. 9½ in. |
| Length over vestibule | 26 ft. 9½ in. |
| Width over all | 8 ft. 0 in. |
| Rail to trolley base | 12 ft. 6 in. |
| Body | Semi-steel |
| Interior trim | Bronze |
| Headlining | None, rafter finish |
| Roof | Arch |
| Air brakes | Safety Car Devices Company |
| Axles | Brill |
| Bumpers | American Car channel iron |
| Car trimmings | Brill |
| Couplers | None, pull bars used |
| Curtain material | Pantasote |
| Designation signs | Hunter |
| Door mechanism | Safety Car Devices Co.—air operated |
| Hand brakes | American Car, with Pittsburg ratchet drop handle |
| Headlights | Golden Glow, S-M-95 |
| Journal boxes | Brill, with Gurney ball bearings |
| Motors | Two inside hung, GE—258 |
| Sanders | Keystone air sanders |
| Sash fixtures | Bronze |
| Seats | American Car Co. |
| Seating material | Cherry wood, steel and canvas lined rattan |
| Springs | Brill |
| Step treads | Feralun |
| Trolley catchers | Keystone |
| Trucks | Brill 78-M-1 special |
| Ventilators | Brill |
| Wheels | 24-in. diam. |
| Special devices | Faraday high voltage push button system |

**Macon Railway & Light Company, Macon, Ga.,** is building six city cars in its shops.

**Puget Sound International Railway & Power Company, Everett, Wash.,** has placed an order for twelve one-man safety cars.

**Ohio Electric Railway, Springfield, Ohio,** expects to purchase four motor express cars, sixteen flat trail cars, and sixteen box trail cars at a cost of $130,000.

**Little Rock Railway & Electric Company, Little Rock, Ark.,** noted in the May 5 issue as ordering six double-end closed motor cars from the J. G. Brill Company through the United Gas & Electric Corporation, has specified the following details for this equipment.

| | |
|---|---|
| Number of cars ordered | 6 |
| Date of order | April 27, 1917 |
| Date of delivery | Oct. 1, 1917 |
| Builder | J. G. Brill |
| Type | Closed motor |
| Seating capacity | 52 |
| Over bumpers | 47 ft. 8 in. |
| Over corner posts | 34 ft. 8 in. |
| Over all | 8 ft. 7 in. |
| Rail to trolley base | 11 ft. 1 in. |
| Body | Semi-steel |
| Interior trim | Cherry |
| Headlining | ¼ in. Nevasplit |
| Roof | Arch |
| Air brakes | West. |
| Axles | Hammered steel |
| Bumpers | Rico anti-climbers |
| Car trimmings | Bronze |
| Control | West. |
| Curtain fixtures | Forsythe No. 88 |
| Curtain material | Pantasote |
| Designation signs | Keystone, Ill. |
| Door mech. | Burdette Rowntree |
| Wheelguards | H. B. lifeguards |
| Gongs | 12 in. Brill Dedenda |
| Heaters | Consolidated |
| Headlights | Crouse-Hinds |
| Journal boxes | Brill |
| Lightning arresters | not placed |
| Motors | Four West. 506-A-2 |
| Registers | International |
| Sanders | not placed |
| Sash fixtures | O. M. Edwards |
| Seats | Hale & Kilburn No. 300-A |
| Seating material | Cherry wood |
| Step treads | Amer. Abrasive Co. |
| Trolley catchers | Earle No. 7 |
| Trucks | Brill 77-E-1 |
| Ventilators | Railway Utility Co. |
| Wheels | So. W. Co., 26-in. cast iron |
| Special devices | Consolidated buzzer system, Ellcon stanchions, Railway Utility thermostats, Brill center and side bearings, Brill graduated spring system and Brill bolster guide arrangement. |

## NEW YORK METAL MARKET PRICES

| | June 28 | July 5 |
|---|---|---|
| Prime Lake, cents per lb. | 32½ | 31¾ |
| Electrolytic, cents per lb. | 32½ | 31¾ |
| Copper wire base, cents per lb. | 36 | 36 |
| Lead, cents per lb. | 11¾ | 11⅝ |
| Nickel, cents per lb. | 50 | 50 |
| Spelter, cents per lb. | 9⅝ | 9¼ |
| Tin, Straits, cents per lb. | 62 | 62 |
| Aluminum, 98 to 99 per cent, cents per lb. | 61 | 59 |

## OLD METAL PRICES

| | June 28 | July 5 |
|---|---|---|
| Heavy copper, cents per lb. | 28½ | 28 |
| Light copper, cents per lb. | 25½ | 25 |
| Red brass, cents per lb. | 17½ | 20 |
| Yellow brass, cents per lb. | 18 | 18 |
| Lead, heavy, cents per lb. | 8¾ | 8¾ |
| Zinc, cents per lb. | 7¼ | 7¼ |
| Steel car axles, Chicago, per net ton | $53.00 | $50.00 |
| Old Car wheels, Chicago, per gross ton | $43.00 | $39.00 |
| Steel rails (scrap), Chicago, per gross ton | $48.50 | $49.50 |
| Steel rail (relaying), Chicago, per gross ton | $53.50 | $59.50 |
| Machine shop turnings, Chicago, per net ton | $20.00 | $19.50 |

## CURRENT PRICES FOR MATERIALS

| | June 28 | July 5 |
|---|---|---|
| Rubber-covered wire base, New York, cents per lb. | 36½ | 36½ |
| No. 0000 feeder cable (bare), New York, cents per lb. | 36½ | 36½ |
| No. 0000 feeder cable stranded, New York, cents per lb. | 33¾ | 33¾ |
| No. 6 copper wire (insulated), New York, cents per lb. | 33 | 33 |
| No. 6 copper wire (bare), New York, cents per lb. | 36 | 36 |
| Rails, heavy, Bessemer Pittsburgh | $38.00 | $38.00 |
| Rails, heavy, O. H., Pittsburgh, per gross ton | $40.00 | $40.00 |
| Wire nails, Pittsburgh, per 100 lb. | $3.20 | $4.00 |
| Railroad spikes, 9/16 in., Pittsburgh, per 100 lb. | $4.50 | $5.00 |
| Steel bars, Pittsburgh, per 100 lb. | $4.50 | $4.50 |
| Sheet iron, black (24 gage), Pittsburgh, per 100 lb. | $7.90 | $8.40 |
| Sheet iron, galvanized (24 gage), Pittsburgh, per 100 lb. | $9.30 | $9.55 |
| I-beams over 15 in., Pittsburgh, cents per lb. | 10 | 10 |
| Galvanized barbed wire, Pittsburgh, cents per lb | $4.85 | $4.85 |
| Galvanized wire, ordinary, Pittsburgh, cents per lb. | $4,85 | $4.85 |
| Cement (carload lots), New York, per bbl. | $2.22 | $2.22 |
| Cement (carload lots), Chicago, per bbl. | $2.31 | $2.31 |
| Cement (carload lots), Seattle, per bbl. | $2.60 | $2.60 |
| Linseed oil (raw, 5 bbl. lots), New York, per gal. | $1.18 | $1.16 |
| Linseed oil (boiled, 5 bbl. lots), New York, per gal. | $1.19 | $1.17 |
| White lead (100 lb. keg), New York, cents per lb. | 12¾ | 12¾ |
| Turpentine (bbl. lots), New York, cents per gal. | 43 | 42½ |

## TRADE NOTES

**Lincoln Electric Company, Cleveland, Ohio,** has opened an office at 10 High Street, Boston, Mass., under the direction of W. A. Blachford.

**Walter A. Zelnicker Supply Company, St. Louis, Mo.,** has added W. H. Dayton to its sales staff. Mr. Dayton was formerly secretary and purchasing agent of the Railroad Supply Company, Chicago.

**D. B. Mugan,** formerly associated with the Illinois Central Railroad Company, in charge of its electrical department at New Orleans, La., has been appointed resident manager of the Edison Storage Battery Supply Company, with headquarters at 201 Baronne Street, New Orleans.

**McGovern & Company, New York, N. Y.,** announce that they have opened an office at suite 514, 25 Broad Street, and will conduct a general brokerage business, specializing in public utilities. William J. and Hugh A. McGovern are the principal members of the firm.

**T. G. Whaling,** who has been assistant general manager and sales manager of the Westinghouse Lamp Company, has been appointed general manager. Mr. Whaling will continue also to exercise the functions of sales manager of the company.

**Dunn Wire-Cut Lug Brick Company, Conneaut, Ohio,** reports that the Medora Shale Brick Company, Medora, Ind., has taken out licenses under the Dunn wire-cut patents. The addition of the Medora company gives the Dunn company forty-six licensees, operating seventy-one plants in twelve states.

**J. E. Johnson** has been elected vice-president in charge of purchases and sales of the Laconia Car Company and will be in charge of the New England sales office at 60 Congress Street, Boston. L. N. Hathaway has been appointed purchasing agent of the company, reporting to Mr. Johnson. Mr. Hathaway will make his headquarters at Laconia, N. H.

**W. W. Butler,** vice-president of the Canadian Car & Foundry Company, Montreal, has announced the appointment of R. H. Parks as operating manager of the company. Mr. Parks will have operating charge of all the car plants of the company. He has been identified with the car building industry for many years and went to Canada from the Bettendorf Car Company of Davenport, Iowa. W. S. Atwood has been appointed assistant to the vice-president and managing director.

**L. B. Stillwell Engineering Corporation, New York, N. Y.,** has been organized to act as constructing engineer in the design and construction of steam and hydroelectric, lighting, railway and power plants; electric transmission, electrification of railroads, the design and construction of steel rolling stock, railroad terminals, steam heating plants and general engineering construction work. The officers are: Lewis B. Stillwell, president; H. St. Clair Putnam, vice-president and general manager; Hugh Hazelton, vice-president; W. Everitt Rundle, secretary and treasurer. The principal office of the corporation will be at 100 Broadway.

**David A. Munro** has assumed the management of the railroad department of the Railway Specialties Corporation, with offices at 29 Broadway, New York City. Mr. Munro was born in Scotland and came to this country in February, 1907. His first entry into the railroad field was with the receiver of the Metropolitan Street Railway, New York City, whose service he entered in October, 1907, in the auditor's office. He resigned from that position to enter the service of George W. Linch, receiver Second Avenue Railroad, as assistant to the auditor. He was shortly afterward appointed purchasing agent to the receiver in addition to his other duties. On Dec. 1, 1916, he resigned and entered the supply field as manager of the J. N. Johns Manufacturing Company, a position he held until his present connection with the Railway Specialties Corporation.

**Samuel L. Nicholson,** who has been sales manager of the Westinghouse Electric & Manufacturing Company since 1909, has been promoted to the position of assistant to the vice-president, with headquarters at East Pittsburgh. Mr. Nicholson is unusually well known throughout the electrical profession because of his varied activities bringing him in contact with its numerous branches. His first electric railway work was with the Philadelphia office of the Sprague Electric Railway & Motor Company, and while with this company he assisted in the construction of the Neversink Mountain Railway at Reading, Pa. Later he built the Bristol (Tenn.) Belt Line Railway. In 1892 he became connected with the Short Electric Company. On the absorption of this company by the General Electric Company in 1893 he spent several years successively with the Technic Electric Works, James Boyd & Brothers, the Cutter Electric & Manufacturing Company, and the C. & C. Electric Company, until, in 1898, he joined the New York sales office of the Westinghouse Electric & Manufacturing Company. On the reorganization of the sales department in 1904, he was made manager of the industrial department, which position he successfully filled until his selection as sales manager of the company in 1909. Mr. Nicholson is well known in the electric railway field as a tireless and indefatigable executive of unquestioned ability, and his hosts of friends all over the country will rejoice to learn of the increased field of activities awarded him in his new position.

**Charles S. Clark** has been elected vice-president and general manager of the Laconia Car Company, with headquarters at Laconia, N. H. Mr. Clark is widely known in steam and electric railway circles. He is a native of Winchester, Mass., and entered the steel business in early life, becoming New England representative of the Pennsylvania Steel Company with headquarters at Boston, Mass., in 1890, and retaining this post for twenty-six years. For the past twenty-one years Mr. Clark has been secretary of the Massachusetts Street Railway Association, and holds a unique place in the regard and affections of all connected with this organization, which is otherwise composed exclusively of officials or legal advisers of operating companies. About fifteen years' service in the First Corps of Cadets, M. N. G., stand to the credit of the Laconia company's new manager, who was retired in 1911 with the rank of captain.

CHARLES S. CLARK

## NEW ADVERTISING LITERATURE

**Cutler-Hammer Manufacturing Company, Milwaukee, Wis.:** A booklet on magnetic separator pulleys, used in removing tools, iron bars, etc., from coal as it passes to a crusher.

**General Electric Company, Schenectady, N. Y.**—Bulletin No. 44,424 on "GE-203-P Ventilated Commutating Pole Railway Motor." This motor is an improved form of the GE-203 and is of the box frame type. The GE-203 600-volt motor has a rated capacity of 50 hp. on 600 volts, with an input of 74 amp. The continuous rating for a temperature rise of 65 deg. C. by thermometer is 46 amp. at 600 volts. The same manufacturers have also issued a twenty-four page bulletin, No. 45,601-A, on "Aluminum Lightning Arresters for Alternating-Current Circuits." This bulletin supersedes bulletin No. 45,601, and contains valuable data and diagrams on this installation. The General Electric Company claims that the aluminum type of lightning arrester is superior in protective qualities to any other.

## New Publication

**Electrical Measurements in Practice.** By F. Malcolm Farmer, chief engineer of the Electrical Testing Laboratories. McGraw-Hill Book Company, Inc., New York. 359 pages. Cloth, $4 net.

This book is a compilation of the available information regarding instruments and methods for practical electrical measurements of all kinds. Coming as it does from an engineer prominently identified with one of the leading commercial testing laboratories the book may be assumed to describe only those instruments and methods which are of a practical character. It is interesting to note, however, that it is not substantially different from books along the same lines prepared by teachers, who might be under suspicion of being academic. Mr. Farmer's descriptions are concise and clear, but he does not compare the several methods of making any one of the numerous electrical measurements as fully as might be desired. The book will, however, be useful to anyone who has electrical testing to do, in furnishing him with several practical plans for making any desired measurement.

Blarney

Some railway salesmen don't find it necessary to kiss the Blarney Stone to acquire the gift of blarney.

It's born with 'em, it is.

Blarney is good to listen to, but it never stopped a car when a heedless pedestrian or a careless driver suddenly got into the danger zone.

There's no blarney about the Peacock Brake. Knowing that it is relied upon to save life and property, we put into it the best materials we can buy and the best thoughts that we can secure from the fullness of our experience and the co-operation of our operating customers.

Have you written "Peacock Brakes" unmistakably in your specification for new cars?

National Brake Co.
Buffalo, N. Y.

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Electric Railway Lighting and Power Company Bonds
ENTIRE ISSUES PURCHASED
**THE NATIONAL CITY CO.**
NATIONAL CITY BANK BUILDING
55 WALL STREET, NEW YORK

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**THE ARNOLD COMPANY**
ENGINEERS—CONSTRUCTORS
ELECTRICAL—CIVIL—MECHANICAL
105 SOUTH LA SALLE STREET
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**ALBERT S. RICHEY**
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WORCESTER POLYTECHNIC INSTITUTE
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Purchase, Finance, Construct and Operate Electric Light, Gas, Street Railway and Water Power Properties.
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ENGINEERS CONTRACTORS
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**Arthur D. Little, Inc.**
An organization prepared to handle all work which calls for the application of chemistry to electric railway engineering—such as the testing of coal, lubricants, water, wire insulation, trolley wire, cable, timber preservatives, paints, bearing metals, etc.
*Correspondence regarding our service is invited.*
93 Broad Street, Boston, Mass.

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BUREAU OF INSPECTION TESTS & CONSULTATION
Inspection and Test of all Electrical Equipment
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ENGINEERS
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Industrial Plants and Buildings, Steam Power Stations, Water Power Developments, Substations, Gas Plants, Transmission Lines, Electric and Steam Railroad Work.
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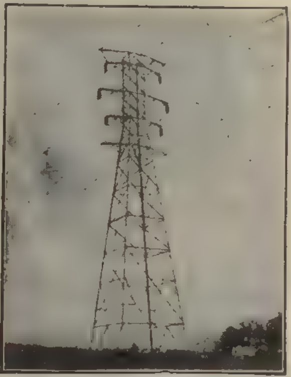
AMERICAN BRIDGE COMPANY
HUDSON TERMINAL-30 CHURCH STREET, NEW YORK

*Manufacturers of Steel Structures of all classes particularly* BRIDGES AND BUILDINGS



Transmission Tower, Pittsburgh, Pa.
Duquesne Light Company

SALES OFFICES

NEW YORK, N. Y., 30 Church Street
Philadelphia, Pa. . Widener Building
Boston, Mass. . . John Hancock Bldg.
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PITTSBURGH, PA. . . Frick Building
Buffalo, N. Y. . Marine National Bank
Cincinnati, Ohio. Union Trust Building
Atlanta, Ga. . . . . Candler Building
Cleveland, Ohio . . Guardian Building
Detroit, Mich., Beecher Ave. & M. C. R. R.
CHICAGO, ILL., 208 South La Salle St.
St. Louis, Mo., Third Nat'l Bank Bldg.
Denver, Colo., First Nat'l Bank Building
Salt Lake City, Utah, Walker Bank Bldg.
Duluth, Minn. . . . . Wolvin Building
Minneapolis, Minn., 7th Ave & 2nd St., S. E.

Pacific Coast Representative:

U. S. Steel Products Co. Pacific Coast Dept.
SAN FRANCISCO, CAL., Rialto Building
Portland, Ore. . . . . Selling Building
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**The Coal & Iron National Bank of the City of New York**

Capital, Surplus & Profits $1,635,000
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**Offers to dealers every facility of a New York Clearing House Bank.**

SAMUEL STEPHENSON SONS & CO.
**Buy Entire Issues of Electric Railway, Light and Power Bonds**
RAILWAY ENGINEERS AND CONTRACTORS
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THE P. EDW. WISCH SERVICE
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Suite 1710
Park Row Bldg., New York
Suite 715
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**The subscription was discontinued because a "Want" Advertisement brought results**

Editor—"We are sorry to lose your subscription, Mr. Jackson. What's the matter? Don't you like our politics?"

Mistah Jackson—"'Tain't dat, sah; 'tain't dat. Mah wife jes' been an' dun landed a job o' wuk for me by advertisin' in youh darned ole papah."

If you're looking for a "job o' wuk" in the electric railway field—

—if you're looking for a competent man who will be able to handle a big or a little "job o' wuk" and who will bring RESULTS—

—there is no more efficient or economical method of securing either than the insertion of a card in the

SEARCHLIGHT SECTION

Copy for "Want" and "For Sale" cards can be received on Wednesday for issue out on Saturday.

ELECTRIC RAILWAY JOURNAL
239 West 39th Street, New York

# Collier Service

## Produces the Cards That Pay

Nothing looks simpler than a completed car card, yet few things are more complex in the making.

There is first the nature of the article—Is it of a kind that can be profitably advertised in a card?

Second—Has straight text or art work proved most effective with this particular article?

Third—What colors and designs are most suitable?

Fourth—How often should the cards and the line of appeal be changed?

These problems are but a fraction of the many that arise in preparing a campaign for a Collier car advertiser.

# Collier Service

is so extensive that each step receives the attention of a group of specialists. Their one thought—How to make car advertising bring the largest possible returns to the advertiser—maintains the value of this asset of the railway company.

Barron G. Collier INCORPORATED

**Candler Building**

**220 West 42nd Street, New York City**

# Boosting the Earnings of Electric Railways

is the problem attacked in this new and unusual volume.

It is the first book to take up solely the improvement of transportation methods in the light of recent progress.

The various expedients, good and bad, now being adopted by city and interurban roads are fully discussed; and the resulting effect upon earnings is shown.

The book points out in a practical way how traffic—passenger, freight and express—may be increased by suitable exploitation methods.

It illustrates, describes and demonstrates the results of new equipment appliances for expediting traffic and collecting fares.

This book should be in the hands of every executive, traffic manager, railway engineer and investor in electric railway securities.

It will suggest many means of developing the road, serving the public to better advantage and, hence, increasing the net earnings.

## Electric Railway Transportation

By **Henry W. Blake,** Editor, and **Walter Jackson,** formerly Assoc. Editor of the Electric Railway Journal.

487 *pages,* 6 *x* 9, 120 *illustrations,* $5.00 (*English price* 21*s.*) *net, postpaid.*

### Our Approval Offer

The value of this book to you can best be judged by an examination of the volume itself. We will send you a copy for 10 days' consideration free of cost and without any obligation. Use the coupon to get the book now. Look it over, at our expense, with reference to your own problems.

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239 WEST 39TH STREET, NEW YORK

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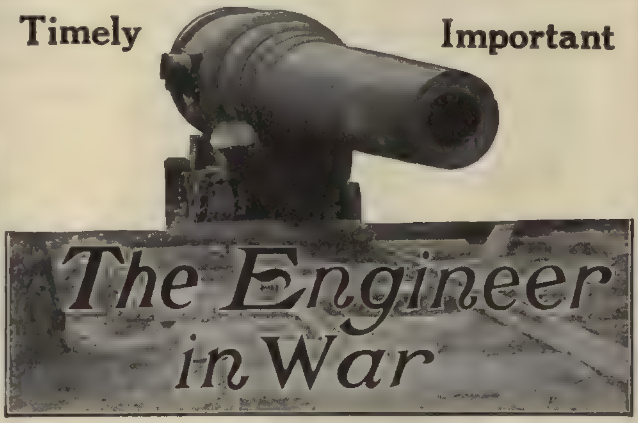
6 & 8 BOUVERIE ST., E.C.

*Publishers of Books for Electric Railway Journal*

**Timely** **Important**



**By P. S. Bond**

Major, Corps of Engineers, U. S. Army, Member Am. Soc. C. E., Honor Graduate Army Field Engineer School, Graduate Army Staff College.

*Pocket size, flexible binding,* 175 *pages, about* 75 *illustrations,* $1.50 *net, postpaid.*

Approved by the Secretary of War, the articles in this book comprise a complete answer to the question—

*"What service can the technically trained man render in carrying on war?"*

## FREE EXAMINATION COUPON

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You may send me on 10 days' approval the books checked:

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**....Bond—The Engineer in War, $1.50 net.**

I agree to pay for the books or return them postpaid within 10 days of receipt.

....I am a regular subscriber to the Electric Railway Journal.
....I am a member of the A. I. E. E. or A. E. R. A.

(Signed) ..........................................

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(Not required of subscribers to the Electric Railway Journal or members of A. I. E. E. or A. E. R. A. Books sent on approval to retail customers in U. S. and Canada only.)

# The Growth of Oxy-Acetylene Welding and Cutting and the Increasing Demand for Davis-Bournonville Apparatus

## *A Year Ago we said—*

"The growth of Oxy-Acetylene Welding and Cutting in the United States is shown by the increasing use of Davis-Bournonville apparatus, which is inseparably associated with the development and success of the oxy-acetylene industry in this country.

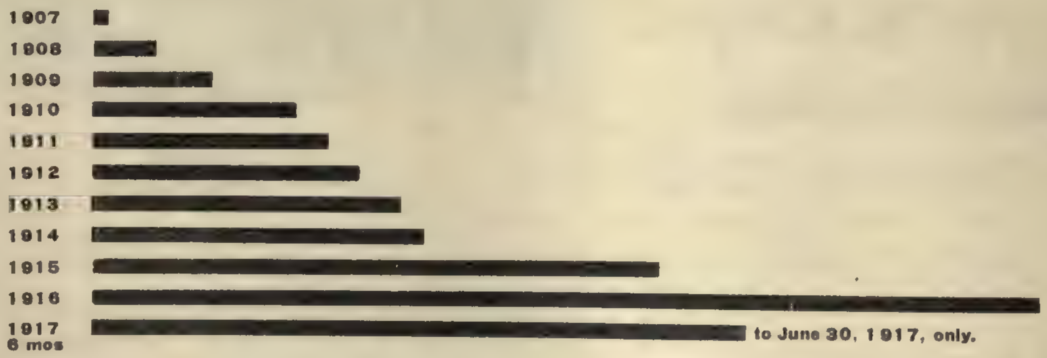
"Ten years ago the process was unknown in the United States. To-day it forms one of the great industries of the country, with its requirements for acetylene, oxygen and efficient apparatus.

"The Davis-Bournonville Company obtained the United States patents for the independent positive-pressure type of welding torch (mixing the gases in an interchangeable tip or nozzle) in 1906—basic principles which have been retained in the D-B torch because of their proven superiority through ten years of development, improvement and the most successful operation.

"There is more Davis-Bournonville welding and cutting apparatus in successful use in the United States than of any other make, and the prominent concerns which have established the greatest success with this process have large installations of D-B apparatus, with from ten to one hundred or more torch units, and from one to six of the largest acetylene generators."

## *Today—*

the increasing use of oxy-acetylene process for welding and cutting and of Davis-Bournonville apparatus are parallel and are graphically shown by the sales of "Davis Apparatus" as charted below:



"Davis Apparatus" Leads the World in Range, Efficiency and Number of Successful Users. Write for bulletins and information showing why it is used by the largest steel mills, foundries, ship-yards, locomotive and car builders, U. S. Navy Yards and government works, mines, sheet metal working factories, tube and barrel welders, scrap yards, and in hundreds of small repair shops and garages.

# DAVIS-BOURNONVILLE CO.

General Offices and Factory, Jersey City, N. J.

NEW YORK
BOSTON
PHILADELPHIA

PITTSBURGH
CLEVELAND
CINCINNATI

OXY-ACETYLENE WELDING
DAVIS
APPARATUS
DAVIS-BOURNONVILLE CO. N.Y.

CHICAGO
DETROIT
ST. LOUIS

SEATTLE
SAN FRANCISCO
TORONTO, ONT.
(Carter Welding Co.)

# This car's record points the way

For years we have pointed out to railway men that Hess-Bright ball bearings were essential in order to realize the *maximum* economy accruing from the use of ball bearings.

This car's record lends striking emphasis to the superiority of Hess-Brights in railway service.

On this 52,000-lb. car Hess-Bright bearings have been in operation for 200,000 car miles on G.E. No. 74 motors, 65 hp.

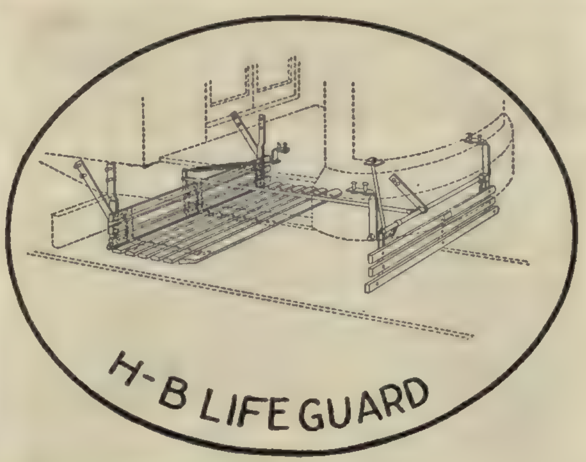
When removed the bearings were measured for wear, with the following results:

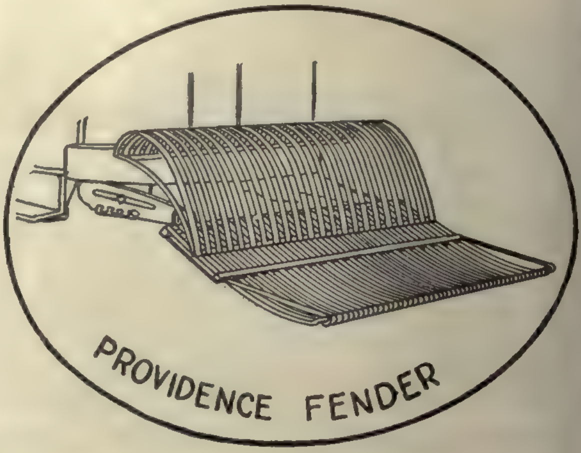
The pinion bearing ........ only .009" radial freedom
The commutator bearing .. only .0014" radial freedom

A slight grinding and polishing of the race grooves will make the bearings practically as good as new and ready for another 200,000 miles of typical H-B service.

*Hess-Bright's Conrad Patents*
*Are Thoroughly Adjudicated*

HESS-BRIGHT
PHILADELPHIA





You Can Safely Claim Exemption

from serious accidents and the resultant costs by fitting every car with the most efficient fender or life guard.

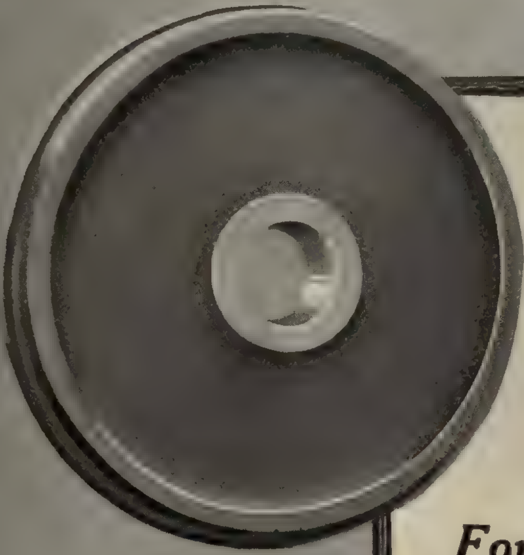
The most important systems in this country (and abroad) standardize on

**Providence Fenders *and* H-B Life Guards**

because actual road service has demonstrated their superiority in keeping the percentage of accidents to a minimum.

Get the opinions of users, sent on request.

**The Consolidated Car Fender Co., Providence, R. I.**
General Sales Agent:
**Wendell & MacDuffie Co., 61 Broadway, N. Y.**



# Standard for 67 Years

The Chilled Iron Wheel has performed its every function at a minimum cost.

**The Wonderful Single-Service Chilled-Iron Wheel**

***For Freight Cars***

95% of all cars in this type of service are carried on Chilled Iron Wheels.

***For Street Cars***

The Chilled Iron Wheel is Standard for Street Car Service in 95 out of every 100 cities in the United States and Canada, operating 100 cars or over.

***The Conclusion***

to be gained from these figures is that the Chilled Iron Wheel gives the Greatest Service for the Lowest Cost.

**Association of Manufacturers of Chilled Car Wheels**
**1228 McCormick Building, Chicago, Ill.**

Representing Forty-eight Wheel Foundries Throughout the United States and Canada. Capacity 20,000 Chilled Iron Wheels Per Day.

# NUTTALL B P GEARING STILL GROWING IN POPULARITY

In 1916 the increase in the number of B P Gears and Pinions sold over 1915 was................ 55%

The 1917 total quantity for six months is 80% of the entire 1916 production or a probable increase of 60%

Every day new names appear on the list of B P users. Is yours there? We would like to demonstrate that B P will solve your gearing problems.

Send for new Heat Treatment Booklet. It's Free.

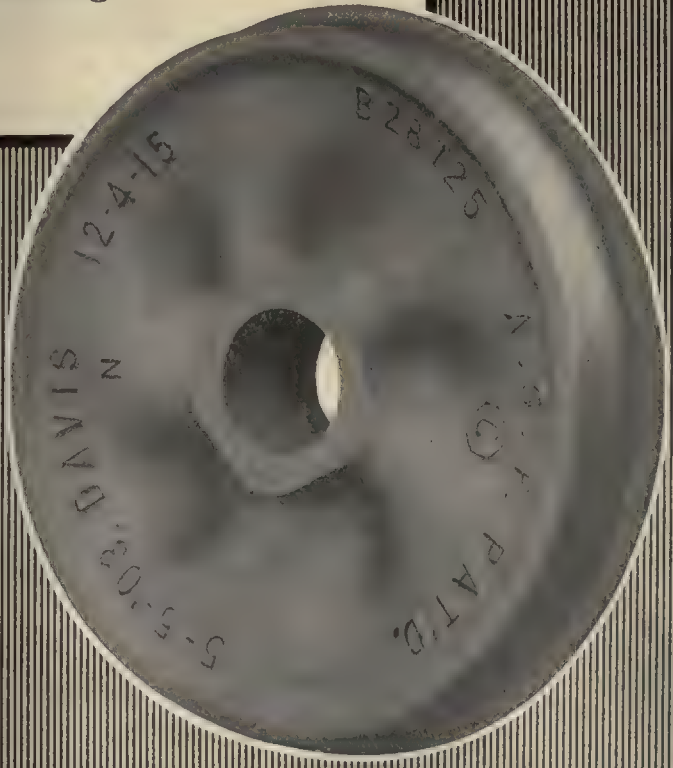
NUTTALL
Pittsburgh

# ECONOMY

—the prime reason for using the Davis Wheel. Economy in weight—economy in maintenance.

**American Steel Foundries**

1105 McCormick Building
CHICAGO



**The DAVIS STEEL WHEEL**

# Columbia Brake Lever

## No. 2

## *The Forging*

On being removed from the furnace, a pair of our husky lads bring the glowing bar to a 5-ton steam hammer, where it is forged most thoroughly for the responsible work it will have to do.

Step No. 3 will show the squaring off of the ends.

And, in the meantime, remember that we are also making:

TOOLS

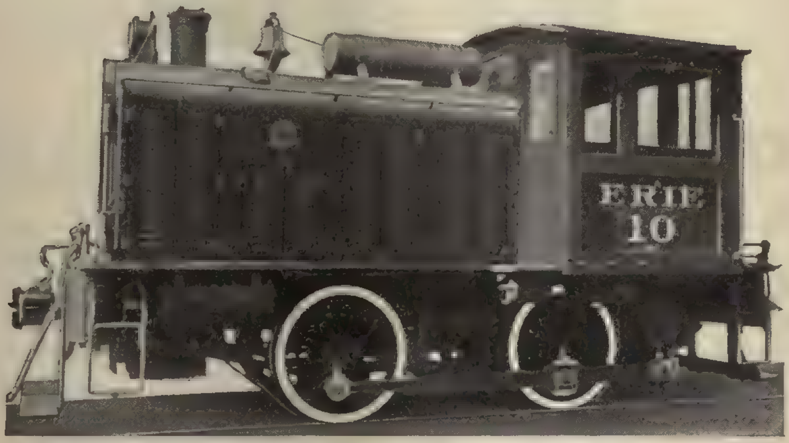
Armature and Axle Straighteners
Armature shaft straighteners
Armature buggies and stands
Babbitting molds
Banding and heading machines
Car hoists
Car Replacers
Coil taping machines for armature leads
Coil winding machines
Pinion pullers
Pit jacks
Signal or target switches
Tension stands

CAR EQUIPMENT

Armature and Axle Bearings
Armature and field coils
Bearings (Axle and Armature)
Brush-holders and brush-holder springs
Brake, door and other Handles
Brake forgings, riggings, etc.
Car trimmings
Commutators
Controller handles
Forgings of all kinds
Gear cases (steel or mall. iron)
Grid resistors
Third-rail shoe beams and accessories
Trolley poles (steel) and wheels

**Columbia Machine Works & Malleable Iron Co.**
Atlantic Ave. and Chestnut St., Brooklyn, N. Y.
W. R. Kerschner Co., Inc., N. Y. Holden & White, Inc., Chicago F. F. Bodler, San Francisco

# BALDWIN



**Baldwin Standard Gauge Gasoline Locomotive**

Cylinders (6)—7¾ x 12 inches
Wheels, diam.—42 inches
Wheel-base—6 ft. 6 inches
Height—11 ft. 0 inches
Width—9 ft. 0 inches
Length—18 ft. 8 inches
Weight—45,000 lbs.

The need of a self-contained locomotive, independent of a third rail or an overhead wire; that is simple in construction, reliable in operation and easily handled, is often felt in electric railway service, especially in work about repair shops, power plants and terminals.

**Baldwin Gasoline Locomotives** meet these conditions admirably. The four lighter classes, weighing 3½, 5, 7 and 9 tons respectively, are specially suitable where tracks are of narrow gauge. A larger class built for standard gauge track only, and weighing about 23 tons, is illustrated above. This design is suitable for general switching service.

These locomotives have a positive drive from engine to wheels, and the transmission throughout is designed for severe duty. The wheels are driven from a jack-shaft by specially designed side rods; and the construction is such that the entire weight of the motor, transmission and jack-shaft is spring supported. The locomotive therefore rides easily and causes little wear of track.

**Baldwin Record No. 85** describes these machines; and correspondence is solicited from electric railway managers who wish to obtain further particulars.

## THE BALDWIN LOCOMOTIVE WORKS

Philadelphia, Pa.

REPRESENTED BY

F. W. Weston, 120 Broadway, New York, N. Y.
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C. H. Peterson, 1210 Boatmen's Bank Bldg., St. Louis, Mo.
George F. Jones, 407 Travelers' Building, Richmond, Va.
A. Wm. Hinger, 512 Northwestern Bank Bldg., Portland, Ore.
Williams, Dimond & Co., 310 Sansome St., San Francisco, Cal.

RELIABILITY - PERMANENCE - ECONOMY.

OKONITE

TRADE MARK
REG. U. S. PATENT OFFICE.

The STANDARD for RUBBER INSULATION

**Railway Feed Wires** insulated with OKONITE are unequaled for flexibility, durability, and efficiency, and are in use by the leading Electric Street Railway Companies. OKONITE is preferred above any other insulation for Car Wiring, Telegraph and Telephone Purposes.

OKONITE WIRES—OKONITE TAPE
MANSON TAPE—CANDEE WEATHERPROOF WIRES
CANDEE PATENTED POTHEADS

***Samples and Estimates on Application***

**THE OKONITE COMPANY, 501 Fifth Ave., cor. 42nd St., New York**

**CENTRAL ELECTRIC CO., Chicago, Ill., General Western Agents**

**F. D. Lawrence Electric Co., Cincinnati, O.** **Novelty Electric Co., Philadelphia, Pa.** **Pettingell-Andrews Co., Boston, Mass.**

TROLLEY WIRE

Round Grooved and Figure 8

If you will agree that one make of trolley wire is able to give longer service than another make—

That one is more economical than another—

Then investigate our trolley wire with a view to cutting your wire costs.

STAR BRAND
Made to Wear, To Wear Well
WEATHER PROOF WIRE

Weatherproof Wires and Cables

Star Brand

Star Brand Wires are made with long service as the most prominent feature.

Because of their ability to render long service they cut wire costs.

Read the words in the cut of the star.

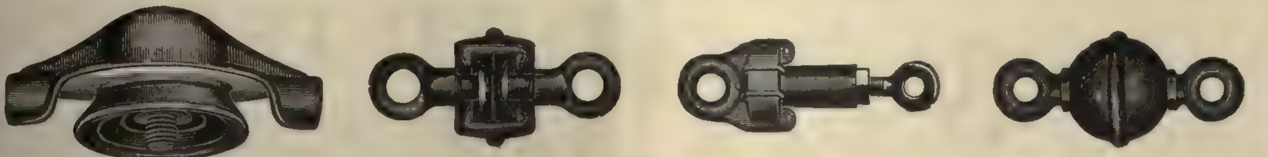
American Electrical Works

**NEW YORK: 165 Broadway**
**CHICAGO: 112 West Adams Street**
**BOSTON: 176 Federal Street**

Phillipsdale, R. I.

**CINCINNATI: Traction Building**
**SAN FRANCISCO: 612 Howard Street**
**SEATTLE: 1002 First Avenue South**

3105



You Can Minimize Overhead Repair Work

and successfully cut maintenance costs if you turn to

The Macallen Line

of strain insulators, hangers, splicing ears, crossings, and other overhead material.

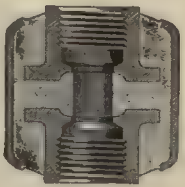
They are "specialty" products, designed and built to make "Macallen" the standard on American railways.

It will pay you to write for information and prices.

The Macallen Insulating Joint

Adopted by principal air brake manufacturers as part of their standard equipment. Also insulates steam pipes, etc. Shell is seamless drawn steel, nipples are machined from steel rod, and insulating material is Macallen Vulcanite Compound, not affected by heat or oil—practically indestructible.

May We Send Our Catalog?



TRADE MACALLEN MARK.

The Macallen Company
Macallen and Foundry Sts., Boston

TRADE MACALLEN MARK.

Steel Cross Ties

are the recognized standard for permanent track construction by many representative street railways.

A trial will demonstrate their economy.

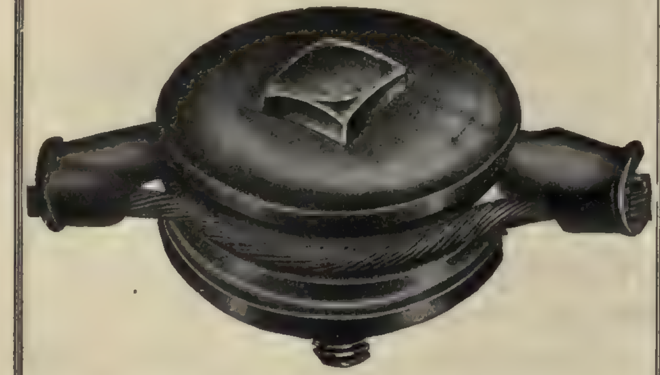
Carnegie Steel Company

General Offices: Pittsburgh, Pa.

3-T

# 3
## (Three)
## Simple Parts

and only three parts, make up White's Porcelain Trolley Hanger. This is a big advantage in shortening the time and labor of installation and in lengthening the service life of the hanger.



# WHITE'S
## Porcelain
## Trolley Hanger

consists of the sherardized malleable iron yoke, the heavy glazed porcelain insulator and the "stud"—a standard bolt, sherardized or furnished in bronze.

The illustration will convince you of the ease of installation and alignment. You can see that this hanger will give service, too—there is no possibility of the insulation "breaking down" or cracking.

We will send you a sample and it will tell its own story to you. Let us give you quotations on complete hangers or parts which we have in stock for

***Immediate Delivery.***

**T. C. WHITE**
**Electrical Supply Co.**
**1122 Pine Street, St. Louis, Mo.**

**Foreign Representatives: Forest City Electrical Service Supply Co., Salford, England.**

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# FORD TRIBLOC

## The Chain Hoist in the Foreground of Service

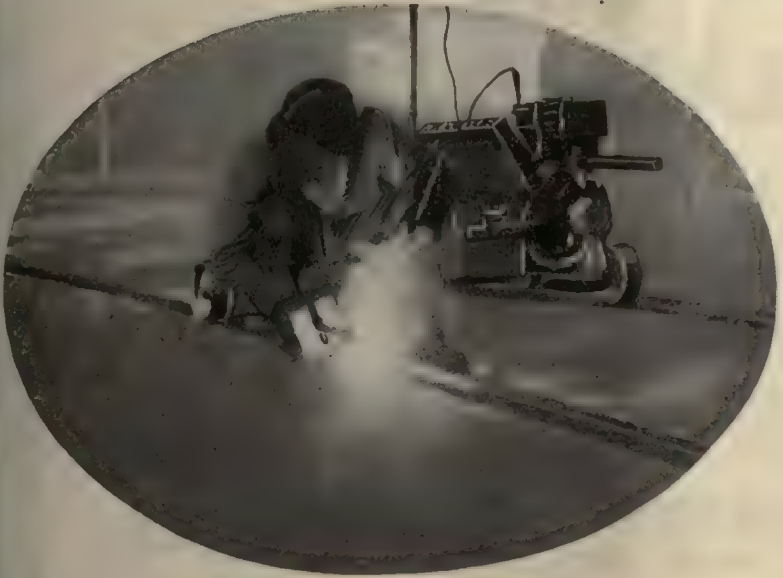
They say you can always tell whether a picture of a street scene is real by looking for the Fords. The same is true of shop scenes—only in this case the Fords are Ford Tribloc Chain Hoists. Manufactured, marketed and guaranteed for five years by Ford of Philadelphia.

**Ask for Catalog**

**FORD CHAIN BLOCK & MFG. CO.**
**142 Oxford Street - - - Philadelphia, Pa.**

2090D

# With the Lincoln Bonding System



## Bond Replacement Jobs Are Not Prohibitive

When you buy the Lincoln portable generator set for bonding, you buy a bonding equipment that will enable you to install a few bonds here and there from time to time—

Almost as economically as if you were using it for the installation of hundreds of bonds in straightaway work.

The portability and one-man operation of the Lincoln Bonding System will insure you against the prohibitive expense ordinarily attached to the replacement of individual bonds.

A true Integral Weld made in the shortest time at a minimum cost and without resistance losses.

AGENTS:
LEWIS & ROTH COMPANY
1012 Liberty Bldg., Philadelphia, Pa.
519 W. 38th St., New York City, N. Y.
CHARLES N. WOOD COMPANY
14 Federal St., Boston, Mass.
HOLDEN & WHITE, Inc., Chicago
343 S. Dearborn St.
W. C. BURDICK, Milwaukee, Wis.
808 First National Bank Building
W. H. ELLIOT, Chattanooga, Tenn.

**The Lincoln Bonding Co.**
**636 Huron Road, Cleveland, Ohio**

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# Drew Trolley Frogs

## reduce service costs

Bronze or Malleable from the Same Pattern

The approaches are properly designed to present a smooth, even running surface to the trolley wheel. The metal is so distributed in the pan that tension on the wires can not distort the switch. The approaches are renewable and easily applied.

"Trolley Off" is rare under Drew Overhead. It helps maintain schedules.

You can simplify and reduce the overhead man's work by standardizing on *Drew*. Remember, "it costs least per car mile."

*Send for details of Drew Frogs and Crossings*

**DREW ELECTRIC & MFG. CO.**
**Offices and Works: Indianapolis, Ind.**

Representatives in principal cities.

*Drew Overhead Line Material Is Standard on Keenly Managed Roads*
*Get Quotations*

Sharpen Band Saws with ALUNDUM

An ALUNDUM wheel 1/32 inch thick at work sharpening a fine tooth, metal cutting band-saw.

The wheel goes down the face of the tooth and up the back of the following one, grinding each tooth to the same shape and size, and giving it that sharp and keen cutting edge that will "stand up" under hard service.

NORTON COMPANY
WORCESTER, MASS.

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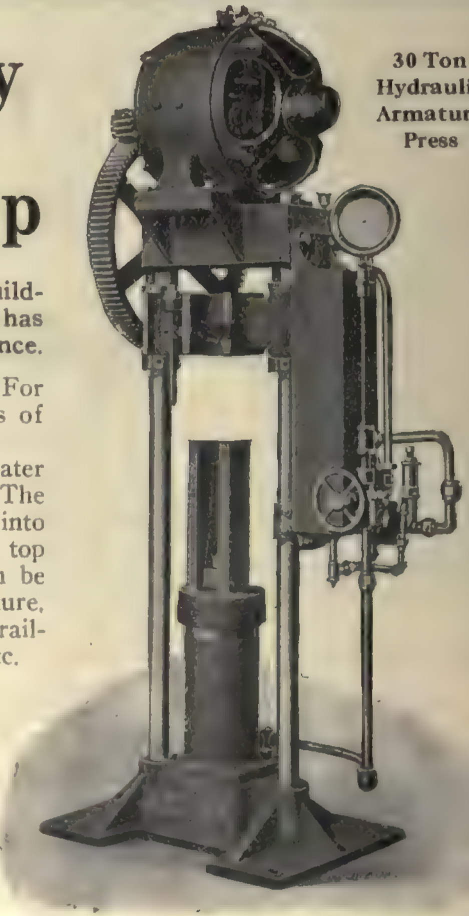
TRADE MARK NORTON REGISTERED



30 Ton Hydraulic Armature Press

Hydraulic Machinery for the Electric Railway Shop

We are and have been for nearly 70 years the foremost builders of hydraulic machinery in this country. Each year has seen some improvement or refinement dictated by experience.

Any railway car shop could own this press profitably. For making repairs to armatures and numerous other operations of pressing, forcing and bending.

The press is a self contained unit requiring no auxiliary water or power supply, driven by a motor like any machine tool. The ram, which moves vertically upward, carries a "U" block into which the armature shaft or mandrel may project. The top yoke swings about one rod on ball bearings, so that it can be easily pushed out of the way while "building up" the armature.

We build many other labor saving tools for the electric railway, including jacks, benders, shears, punches, presses, etc.

*Write for catalogs.*

The Watson-Stillman Co.
Engineers and Builders of Hydraulic Machinery
W-S HYDRAULIC 46 Church St., New York W-S HYDRAULIC
Chicago—McCormick Building

***Your commutators reflect the performance of your brushes***

*If you use*

# DIXON'S
# Graphite Brushes

their perfect service will be reflected in the polished smooth surface they will produce on the commutators of your generators and rotaries.

Dixon brushes are non-scratching—they're self-lubricating; it's impossible for them to score commutators.

And they're eminently suitable for railway station service because graphite brushes adapt themselves peculiarly well to high voltage work.

Let us send you prices on your particular type.

*Address Department 108-M.*

**Made in JERSEY CITY, N. J., by the**
**Joseph Dixon Crucible Company**
**Established 1827**

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# EVIDENCE

**NO**
**DIRT**
**LUMPS**
**PIN HOLES**
**FREE SULPHUR**

The various brands of Friction and Rubber Tapes made by this company fully

## Meet Your Expectations

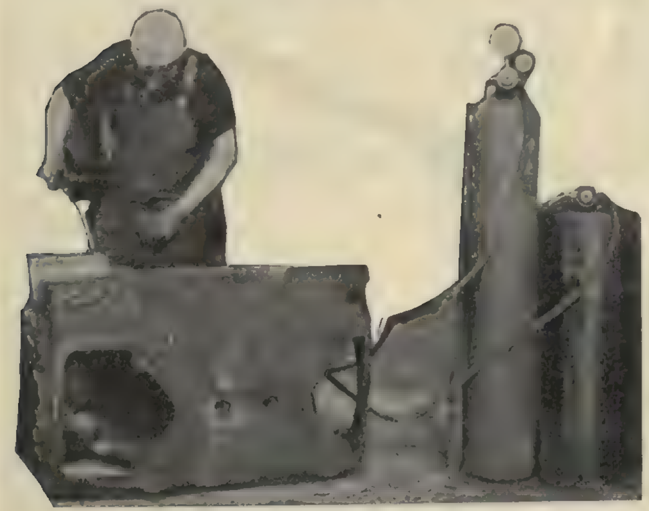
The compounds are unusually smooth and even, and the fabrics are closely woven and uniform.

They unroll easily, and are especially adhesive and durable.

Placing your order now insures prompt delivery.

**Mechanical Rubber Co.**
**Cleveland, Ohio**

# Dodging the Scrap Pile



**by means of**

# OXWELDING

Many street railways are cutting down maintenance expense tremendously. Broken or worn car and machine parts, formerly junked, now come back into service—good as new—quickly and cheaply.

In some cases, even, new parts are being cut out of scrap steel plate. And around the shop and out on the line, in emergencies, Oxweld portable equipment frequently proves itself "worth its weight in gold."

## OXWELD UNIVERSAL SERVICE

is the big, distinctive thing that you'll appreciate most. It places at your disposal the accumulated experience of not only the biggest street railways, but of other industries all over the country as well. It takes up its work right where most "service" stops—after the sale. Oxweld users have at their command an Advisory, Inspection and Repair Service which is absolutely unique.

You see, we've taken a leaf from the Public Utility Company's policy—we're making Good Will as fast as we're making good customers.

You ought to have Bulletin Series 700-R. You ought to know the practical reasons why

OXWELD APPARATUS
WORKS FASTEST, CHEAPEST
AND MOST EFFICIENTLY.

**Oxweld Acetylene Co.**
NEWARK, N. J. CHICAGO LOS ANGELES

*America's Largest Makers of Welding and Cutting Apparatus and Supplies.*

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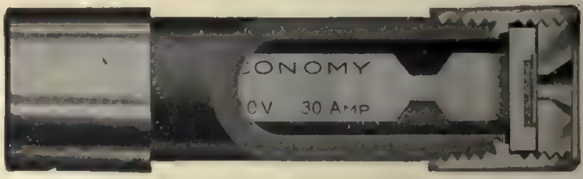
SAFETY ECONOMY renewable cartridge FUSES FIRST

# Protect Cars and Power-plant

Don't trust to your more limited facilities for refilling fuses. As fuse specialists, we furnish reliable and carefully *tested Renewal Links* all ready to insert in

**ECONOMY renewable cartridge FUSES**

when they blow. These Links cost but a trifle and assure a complete break in the circuit at the required overload.



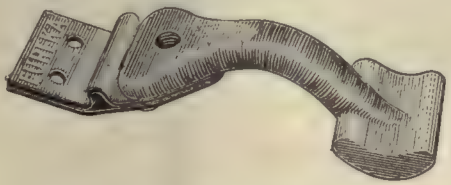
There's no need to use an extra new fuse every time one blows when the ***efficient and safe*** Economy fuse can be renewed over and over again with our ***tested*** Renewal Links at a saving of 80% of fuse maintenance expense under old-style, wasteful methods

*Write now for Bulletin No. 17 and our catalog.*

**Economy Fuse & Mfg. Co.**
**Kinzie and Orleans St.**
**Chicago, Ill.**

**EUREKA CONTROLLER PARTS AND COMMUTATORS**

are standard design, interchangeable with original manufacturer



We have bulletins for

***Controller Parts, Commutators, Brushholders, Trolley Wheels and Line Material***

Send for those desired.

**THE EUREKA COMPANY**
**North East, Pennsylvania**

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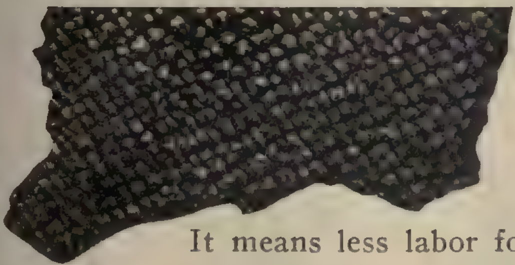
**FABRIKOID**



This elegant super-substitute for leather gives pleasure and comfort to your passengers on account of its rich, clean, inviting appearance.

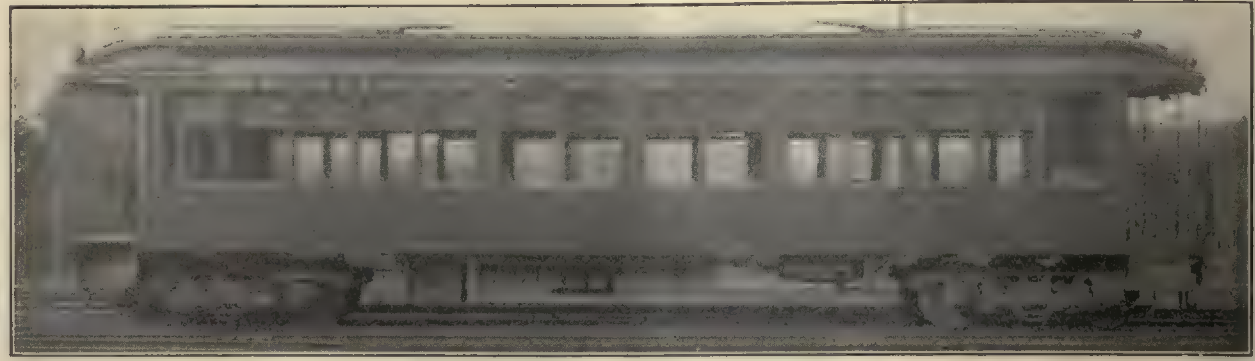
It means less labor for your employees, for Fabrikoid can be cleaned like glass with soap and water. Its cost is less than leather and its service economy greater than any other upholstery material.

**THE DU PONT FABRIKOID COMPANY**
**DU PONT BUILDING WILMINGTON, DEL.**
**Railway Department Representatives**
**WENDELL & MACDUFFIE COMPANY, 609 Broadway, NEW YORK**

The water, grease, perspiration and stain-proof qualities of Fabrikoid and the cleanliness of electric power give a delightful, sanitary condition not approached by any other combination. Samples must interest you. Write for them.

DU PONT FABRIKOID
REG. U. S. PAT. OFF.

**An Ideal Car Seating**



Chosen for Safety and Efficiency by the Brooklyn Rapid Transit

Everything for the safety, convenience and comfort of passengers receives careful consideration in the selection of equipment for this great railway—and it chose "Edwards" as the "safety and efficiency" sash fixture for hundreds of its big cars.

There's a world of merit in Edwards Sash Fixtures. Specify them for *your* cars today.

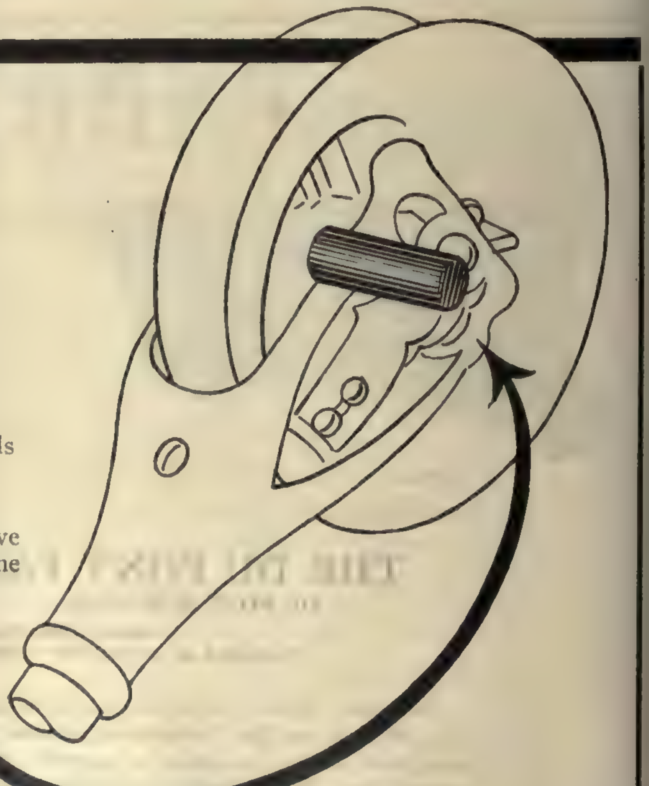
Our Catalog gives the details. Ask for a copy.

**The O. M. Edwards Co., Inc. Syracuse, N. Y.**

**Window Fixtures**
**Top, Bottom and Side Weather Stripping**
**Metal top Casings**
**Metal Extension Platform Trap Doors**
**All-Metal Sash Balances**
**Railway Devices**

It's the Little Things That Count

They are right at the top of the pole
Where current collection STARTS.
They are only small,
But millions of them are in service
Doing their work efficiently and well
Increasing car mileage
And making the LIVES of millions of trolley wheels longer, smoother and sweeter running.
Ask the motormen what they think of—
Bound Brook genuine Oil-less Bearings—which have always been made at Bound Brook, N. J., in the United States of America, by the



Trade Mark
**Bound Brook Oil-less Bearing Co.**
Reg. U. S. Pat. Off.
*Formerly Graphite Lubricating Co.*

# For High Speed Operation

## —Large Diameter Kalamazoo Trolley Wheels

As a solution to arcing and short wheel life on high speed electric railway work, two new Kalamazoo Wheels have been designed.

They are (No. 20) 11½ inches and (No. 21) 10 inches in diameter. An ample increase of width, depth of groove and length of hub insures a well-balanced wheel in each case.

Tests covering considerable mileage at high speeds show that these two new "Kalamazoos" greatly decrease sparking, while offering longer wheel life. There is more bearing on the wire, with consequent greater contact and current carrying capacity.

The patented Kalamazoo Harps have been enlarged to carry these wheels.

Try several on your lines. Compare their service with that of smaller wheels.

*Write Today.*

**STAR BRASS WORKS**
**KALAMAZOO, MICHIGAN**

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## EFFICIENT SERVICE AND PROMPT DELIVERY

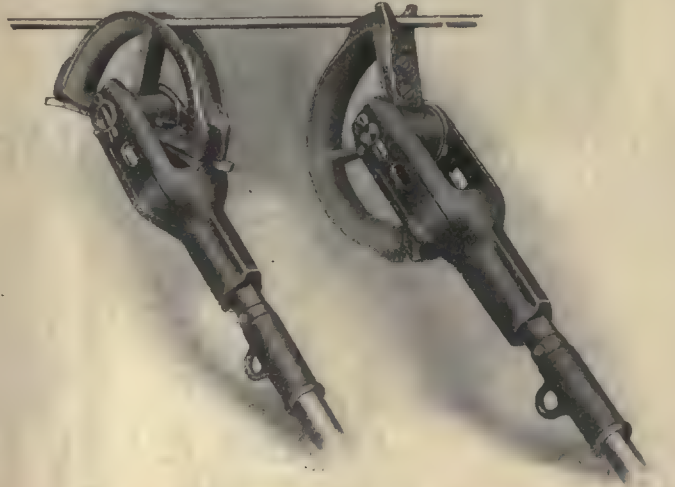
*have placed the*

# BAYONET

*in the front rank. It keeps your cars on schedule time.*

**Bayonet Anti-Friction Base has all wearing parts bushed.**
**Self - Lubricating. Non - Breakable,**
**Poles Changed in One Minute.**

*From Trolley Wheel to Semi-Rotary Sleet Cutter in 10 SECONDS without any tools*



*Write for full particulars and free trial*

**BAYONET TROLLEY HARP CO., Springfield, Ohio**

**EMB Grid Resistors**

**ARE MADE RIGHT AND STAY RIGHT**

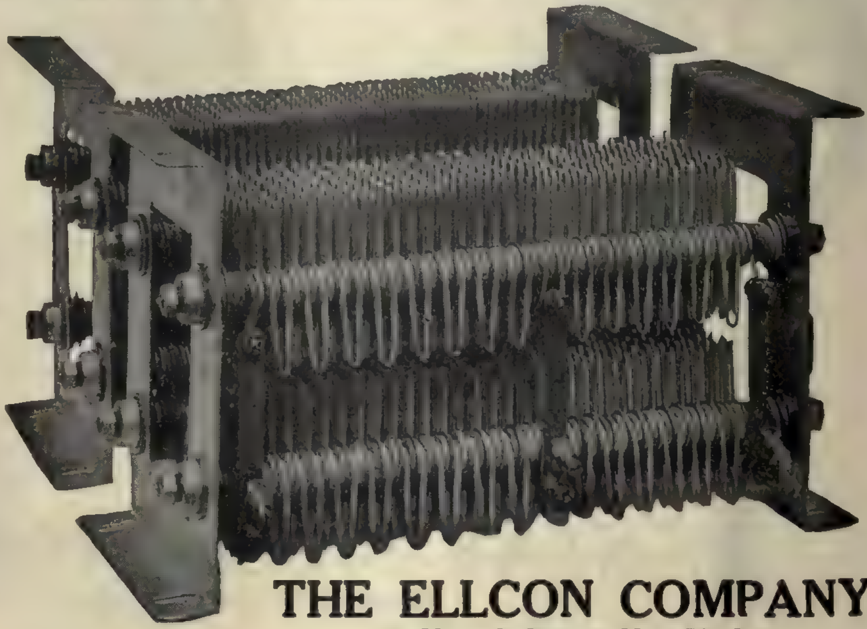
No resistors get more abuse than those under a car.

They are abused electrically by careless operation of the controller.

They are abused mechanically by exposure to dusty, muddy and stone-littered streets.

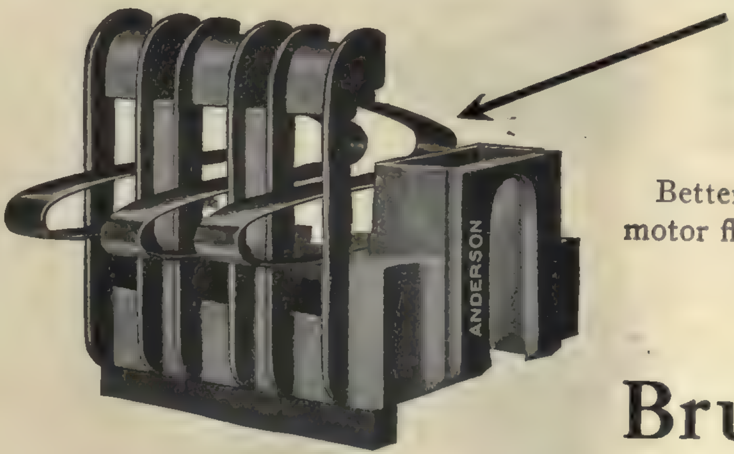
Until the arrival of E M B drawn, non-corroding grid resistors, troubles from these sources seemed unavoidable.

E M B grid resistors actually have made this part of your equipment troubleproof.



**THE ELLCON COMPANY**
**50 Church Street, New York**

***It's all in this spring***



Better commutation and reduced motor flashing is made possible in

**Lindall Brush Holders**

through the constant, uniform contact pressure of these phosphor-bronze springs.

They have no turns to bind and stick as is the case with coil springs.

Another big feature of Lindall Holders is the large and efficient contact surface they afford between brush and holder, which eliminates the necessity of troublesome pigtails—any brush will fit a Lindall—no preparation of cutting or filing is needed.

*Let us send you a bulletin on this maintenance reducer*

**ALBERT & J. M. ANDERSON MFG. CO.**
**289-293 A STREET, BOSTON, MASS., U. S. A.**

NEW YORK
135 Broadway

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429 Real Estate Trust Bldg.

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105 S. Dearborn St.

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# Positively the Best:

We are ready to prove that More-Jones Armature Babbitt Metal will give more mileage at lower cost than any other metal. Our long experience, laboratory research and co-operative policy has taught us that it takes more than formula to make a good Armature Babbitt Metal. It takes the best material—plus the best method of manufacture.

Babbitts composed of used scrap metals may be made to analyze the same as Babbitt made of pure, new material, but they will not give the same efficient results.

It's well to be safe and specify

## More-Jones Armature Babbitt Metal

Specially developed for this particular service. Made of the highest grade material by a process evolved in over forty years of experience in alloying metals. Always uniform in quality and dependable for long service. Exceptionally strong, pliable, tough and possessing the best anti-frictional qualities.

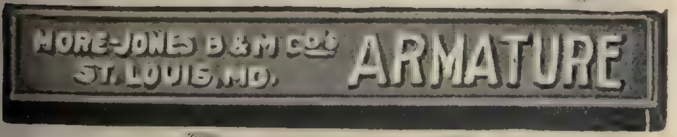
Economical in a double sense, as it not only wears very slowly but it can be re-melted and used over and over again. And it's one-third lighter in bulk than lead-base babbitts, so it requires one-third less to line a bearing.

No one who has ever used MORE-JONES ARMATURE BABBITT METAL has been able to get equal service and economy from any other.

*Further information and prices on application.*

**More-Jones Brass & Metal Co.**

**St. Louis, U. S. A.**



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# SAFE!

## NOARK FUSES

"Play Safe" is a warning never too often repeated in electrical practice. Risks run high and the only barriers against loss of life or property are protective devices of absolute integrity.

If it pays to spend a thousand dollars to ground a system, doesn't it pay to select a fuse which will give positive protection to equipment—particularly when its cost is negligible compared with the value it protects?

"Noark" Fuses assure this protection because each fuse is an accurately calibrated reliable product. You place it in a circuit satisfied that it will blow when, and only when, its rating is reached.

Lock overload trouble from your circuits with this safe combination — "Noark" Fuses.

Furnished in all amperages and voltages.

JOHNS-MANVILLE SERVICE
COVERS THE CONTINENT

*Serves more people in more ways than any other Institution of its kind in the world*

**H. W. JOHNS-MANVILLE CO.**
**NEW YORK CITY**
**10 Factories—Branches in 55 Large Cities**

Le Carbone
Carbon Brushes

Ever since I began selling LE CARBONE Carbon Brushes—eleven years ago—I have repeatedly asserted and reiterated that LE CARBONE Brushes—brush for brush and dollar for dollar—give better service and longer service than any other carbon brush made.

Hundreds and **hundreds** of you brush users have proved this for yourselves.

I could not stay in business if the quality of the LE CARBONE Brush had not backed up my statements **absolutely.**

LE CARBONE
Carbon Brushes
are uniform.

They talk for themselves

Pittsburg Office
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173 Fulton Street
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Canadian Distributors
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*This Type G*

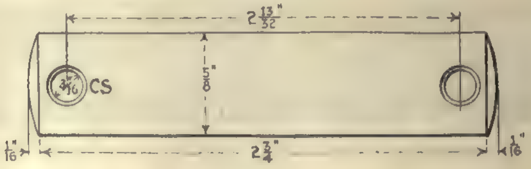
Boyerized
Trolley Wheel Spindle
Made of Cold Rolled Steel
*Gives More Than 4 Times the Life*

of the soft steel spindles that were formerly used on a system which operates more than 2000 cars.

The same road is using with equally good results Boyerized bushings and Boyerized pins for the brake rigging, live and dead lever pins, etc.

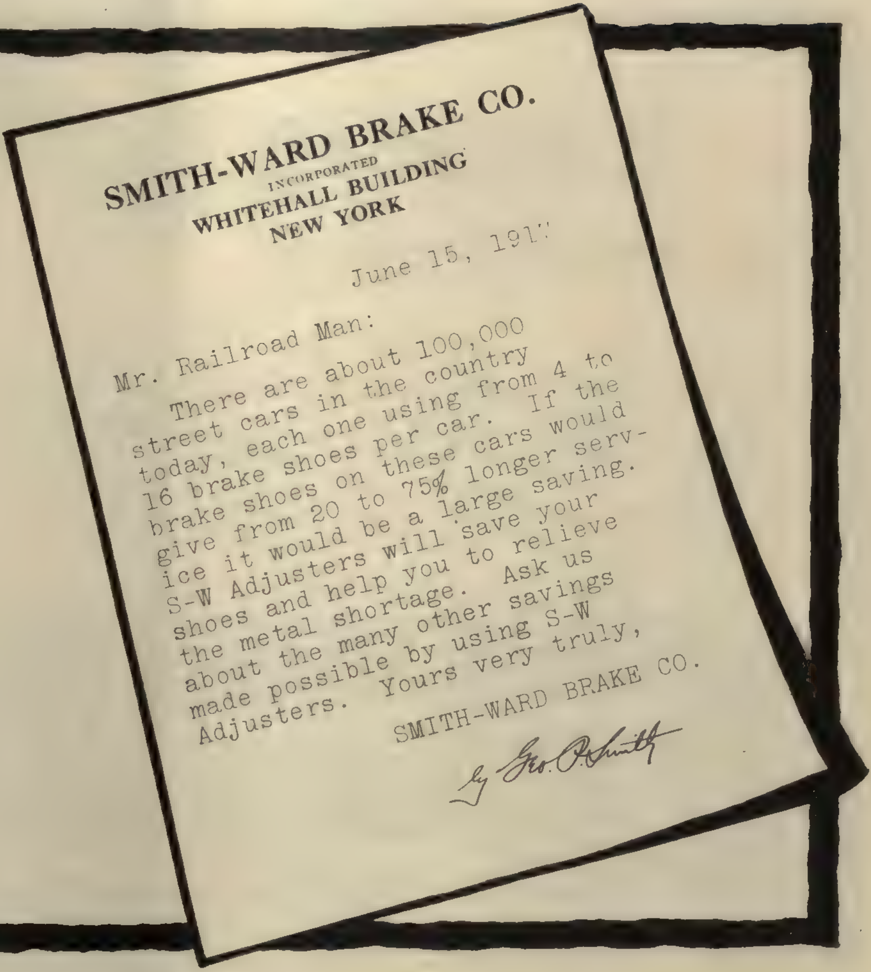
Says the Superintendent of Equipment:

"The best thing about Boyerized pins, bushings, spindles and other anti-wear parts is that they run true to form. Both the case-hardening and the manganese treatment are always uniform."



**Bemis Car Truck Co., Springfield, Mass.**

**HELP RELIEVE THE HIGH COST AND SHORTAGE OF IRON—**



SMITH-WARD BRAKE CO.
INCORPORATED
WHITEHALL BUILDING
NEW YORK

June 15, 1917

Mr. Railroad Man:

There are about 100,000 street cars in the country today, each one using from 4 to 16 brake shoes per car. If the brake shoes on these cars would give from 20 to 75% longer service it would be a large saving. S-W Adjusters will save your shoes and help you to relieve the metal shortage. Ask us about the many other savings made possible by using S-W Adjusters.

Yours very truly,
SMITH-WARD BRAKE CO.
Geo. P. Smith

# GRIFFIN F. C. S. WHEELS

## ARE ECONOMICAL

Many electric railways secure the greatest amount of mileage by the use of a pit car wheel grinder. The cars are run onto the grinder, and in twenty to forty minutes the wheels are ground truly cylindrical, eliminating service defects and making a new wearing surface of the proper taper. A wheel grinder eliminates the cost of removing wheels from the trucks, and re-applying.

The use of Chilled Iron Wheels does not involve the cost of an expensive wheel lathe.

The wear on rails due to flange friction is at a minimum.

Twenty to twenty-five per cent. in the loss of metal of brake shoes is saved.

## GRIFFIN WHEEL COMPANY

McCormick Building, Chicago, Ill.

FOUNDRIES

Chicago Detroit Boston Denver St. Paul Tacoma
Kansas City Los Angeles

The new high speed interurban cars recently placed in service by the Jamestown, Westfield & Northwestern Railroad are fitted with Standard No. 1062 rolled steel wheels mounted on Standard axles.
*—Representative practice*

STANDARD
STEEL WORKS CO.
Morris Building Philadelphia

New York
Chicago
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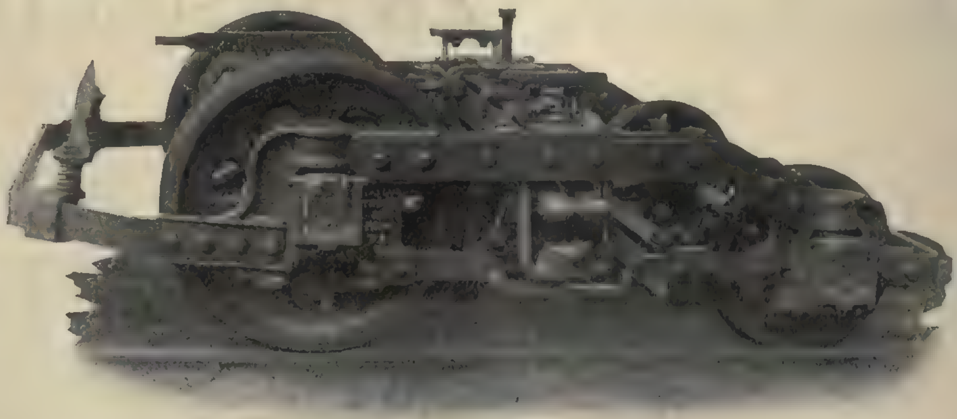
TAYLOR MAXIMUM TRACTION TRUCK



12 FACTS REGARDING "TAYLOR-MADE" TRUCKS

ABSOLUTELY SAFE
RIDE LIKE PULLMANS
SIMPLE IN CONSTRUCTION
REDUCE WEAR OF MOTORS
WILL INCREASE DIVIDENDS
REDUCE COST OF MAINTENANCE

SAVE POWER
SAVE ROAD BED
LIGHT IN WEIGHT
OVERCOME FLANGE WEAR
BRAKES DO NOT CHATTER
PREVENT SIDE OSCILLATION OF CARS

TAYLOR ELECTRIC TRUCK CO., TROY, N. Y.
Established 1892
SPECIFICATIONS ON REQUEST
SEND FOR PORT-FOLIO

# The Van Dorn Radial M. C. B. Coupler and Draft Gear for Interurban Service

The Vertical Pivoting of the Coupler Head prevents binding of the knuckles and relieves all other than normal strain from the CAR PLATFORMS when train of cars is operated over abrupt changes in grades.

The COUPLER Head is held in normal coupling position by TRIPLE SPRING SUPPORT located in casing directly under the coupler head.

Has a POSITIVE LOCK, LOCK SET and KNUCKLE THROW.

Couples by impact and uncouples from side of car.

Has extended guard arm and butting wall which greatly facilitate coupling and prevent buckling.

The deep knuckles permit wide free vertical movement.

This Coupler will interchange with all standard M. C. B. couplers.

THE DOUBLE HERCULES SPRING RADIAL DRAFT GEAR is very effective in absorbing shocks and makes a train move as one car. This equipment will operate perfectly on 30-ft. radius curves.

**Van Dorn Coupler Co., 2325 So. Paulina St., Chicago, Ill.**

**THE LINDSLEY BROTHERS CO.**

Western **"Good Poles Quick"** Northern

Quick Shipments from our Minneapolis Yard

Rooms 832-834, 72 West Adams St., Chicago, Ill.
Spokane - St. Louis

Butt Treating Open Tank and "Hot and Cold" Processes

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**MARSH & McLENNAN** FIRE INSURANCE
Special Attention Given to Traction Insurance

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THESE OFFICES WILL GIVE YOU THE BEST THERE IS IN INSURANCE SERVICE

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**The Trenton THREE SECTION TOWER**

outfits for any make of chassis. Make a low, well-balanced outfit on the road with maximum elevation in use.

Send postal for literature and prices.

**J. R. McCARDELL & CO., Trenton, N. J.**
Patentees and Sole Manufacturers

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**ALUMINUM**

**Railway Feeders**

And all kinds of **Electrical Conductors**

Aluminum feeders are less than one-half the weight of copper feeders and are of equal conductivity and strength. If insulated wire or cable is required, high-grade insulation is guaranteed. Write for prices and full information.

**Aluminum Company of America**
Pittsburgh, Pa.

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CEDAR POLES
POSTS, TIES AND PILING
BUTT TREATING
**The Valentine-Clark Co.**
**General Office: Minneapolis, Minn.**
Toledo, Ohio; Chicago, Ill.; Kansas City, Mo.; St. Maries, Idaho.

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**POLES**
NORTHERN WHITE CEDAR WESTERN RED CEDAR
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**ROEBLING**
ELECTRICAL WIRES AND CABLES
**John A. Roebling's Sons Company**
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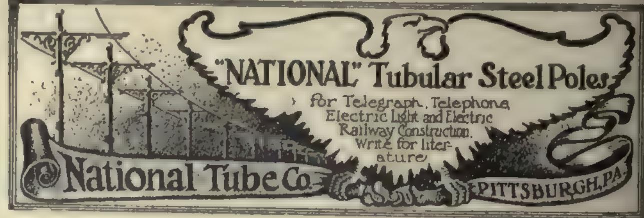
"NATIONAL" Tubular Steel Poles
for Telegraph, Telephone, Electric Light and Electric Railway Construction. Write for literature
National Tube Co.
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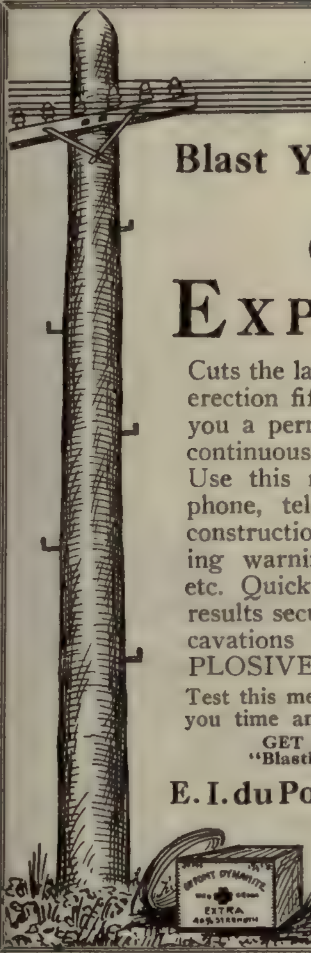

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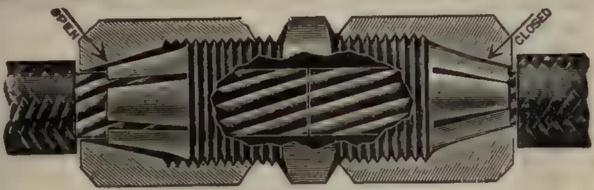

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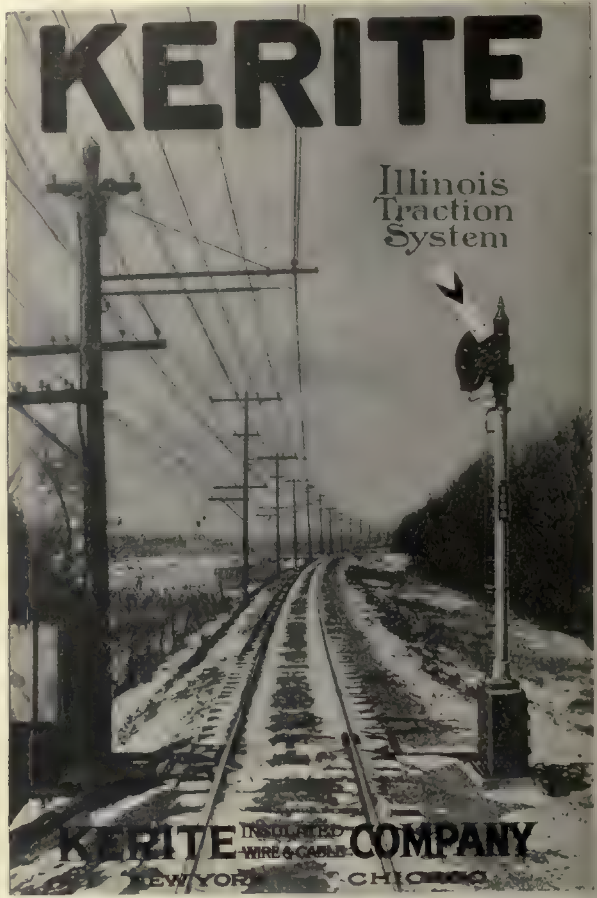

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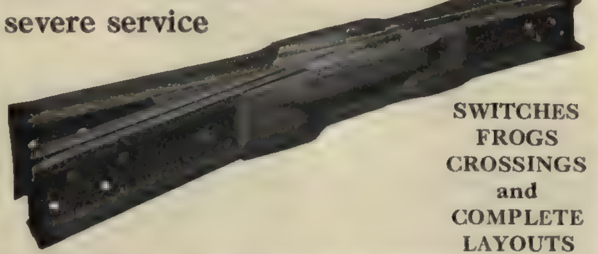

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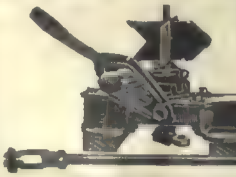

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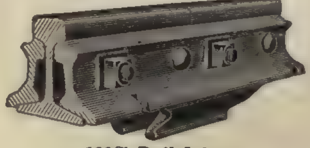

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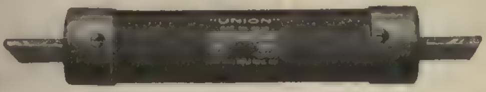

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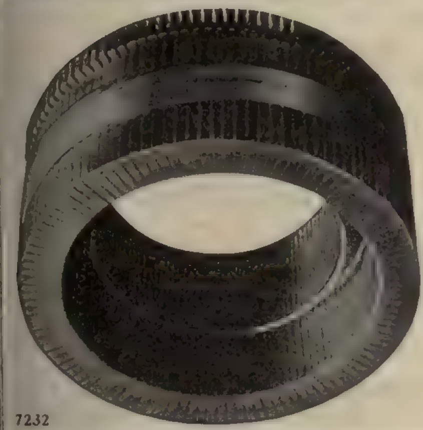

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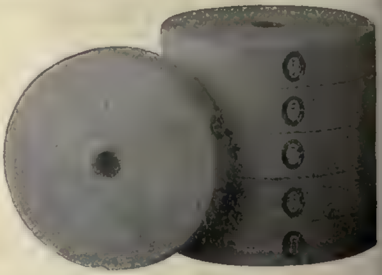

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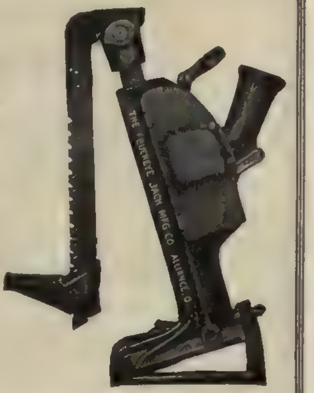
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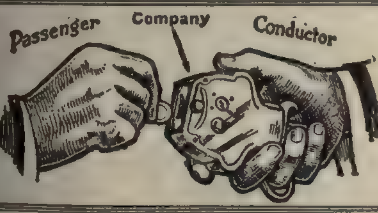

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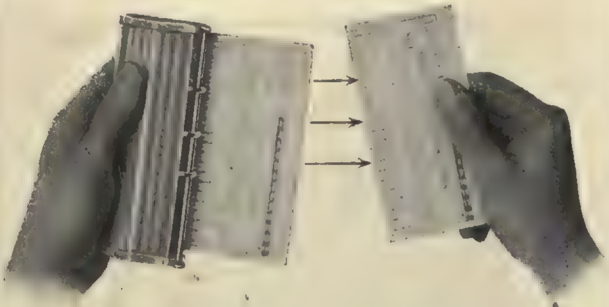

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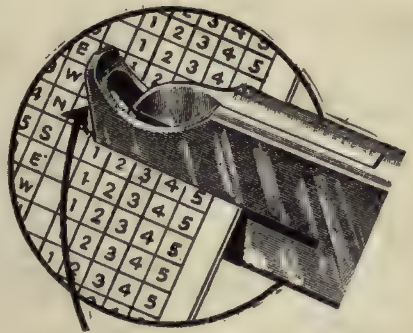

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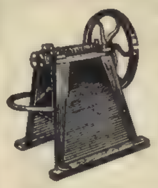

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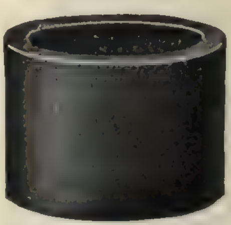
are truly frictionless. The roller instead of turning on a pin rolls freely like a rolling pin.

**A. Stucki Co.**
**Oliver Bldg.**
**Pittsburgh, Pa.**

**LONGWEAR BUSHINGS**
**For Brake Gear**

**Hardened**
**Steel**
**Accurate**
**Uniform**



**also**
**LONGWEAR**
**BRAKE PINS**
**to**
**Specifications**

**E. G. Long Company**
**50 Church Street New York**

When the Trolley Cord Breaks—
*How Long is the Delay?*

**Less than 3 minutes if your car is equipped with an**

Ideal Trolley Catcher

No need to dismantle the catcher. The conductor can put the wheel back on the wire and make the repair with the car running, using the lower portion of the cord to rewind the tension spring.

Ideal Catchers have the large openings top and bottom that prevent snow or ice clogging. They're simply constructed. Remove the centre shaft bolt and every part is accessible.

3000 Ideal Catchers on three large railways cost 7c. each per year for maintenance.

Want names? Write us now.

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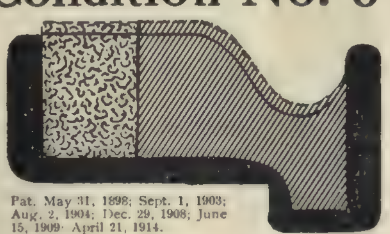
**Wheel Condition No. 6**

When only the outer part of tread needs grinding this arrangement of abrasive and non-abrasive material in the Wheel Truing Brake Shoe will correct matters—and without the car losing a minute's service.



Pat. May 31, 1898; Sept. 1, 1903; Aug. 2, 1904; Dec. 29, 1908; June 15, 1909· April 21, 1914.

**Wheel Truing Brake Shoe Co.**
**Detroit Michigan**

**UNIVERSAL ANTI-SLIP TREADS**

cars and station steps.

**Universal Safety Tread Company**
**Waltham, Mass.**

**MASON SAFETY TREADS**—prevent slipping and thus obviate damage suits.

**KARBOLITH CAR FLOORING**—for steel cars is sanitary, fireproof and light in weight.

**STANWOOD STEPS**—are non-slipping and self-cleaning.

Above products are used on all leading railways. For details address

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You get more than simply BRAKE SHOES when you use our Product.

You get the advantage of our constant effort to improve our product for your service.

You get the earnest co-operation of our engineers to assist you in getting the full quota of service from each Brake Shoe applied.

Miles of service from the Brake Shoe are more to be desired than pounds of scrap.

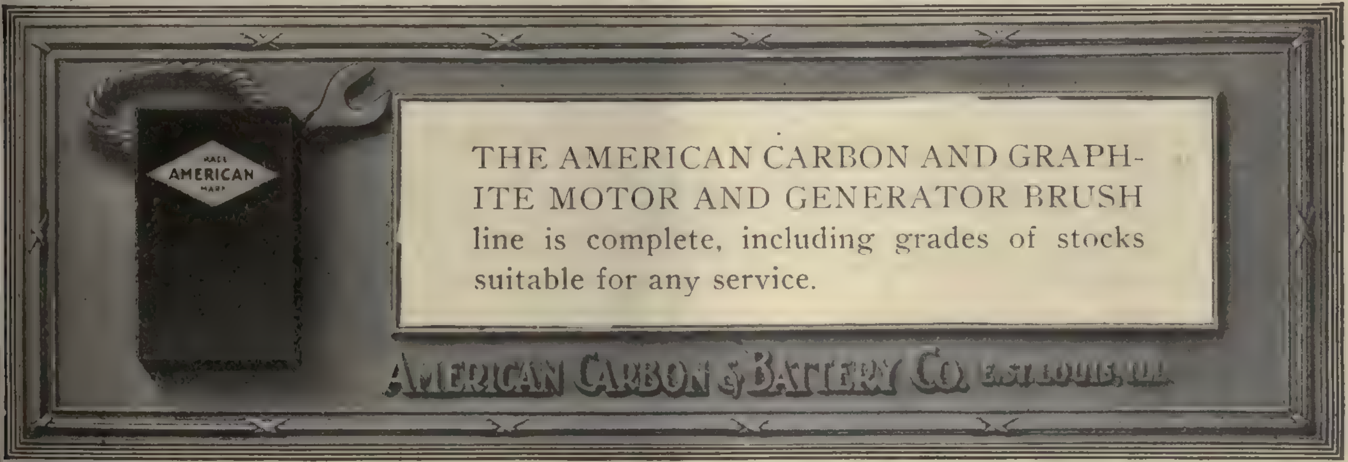
All of which means increased efficiency and decreased cost of Brake Maintenance.

**American Brake Shoe & Foundry Co.**
**30 Church St., New York**
**McCormick Bldg., Chicago** **Chattanooga, Tenn.**

***Most Value per Dollar***

The Gurney Bearing is not a cheap bearing, but it will carry more load per dollar expended than any other bearing you can buy. Look up Gurney load ratings before specifying ball bearings for your motors.

**Gurney Ball Bearing Co.**
*Conrad Patent Licensee*
Chicago New York
Jamestown, N. Y.
142



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AMERICAN CARBON & BATTERY CO. EAST ST. LOUIS, ILL.

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COIL AND ELLIPTIC
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**The "Hycap-Exide" Battery**
for
**STORAGE BATTERY STREET CARS**
**THE ELECTRIC STORAGE BATTERY CO**
**PHILADELPHIA**

The Most Successful Men in the Electric Railway Industry read the

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Horne Double Acting Brakes
Giant Geared Brakes
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# SEARCHLIGHT SECTION

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### Motors

4—West. 38-B **Motors,** complete with 64 teeth, 4" bore, split gears, 18 teeth pinions, and gear casings, extra repair parts, 1 new each upper and lower field coils, 1 new set armature coils, 2 new brush holders, 1 new gear and 1 new pinion. Will sell as a complete lot.

### Compressors

25—AA-1 **Air Compressors.**

### Controllers

12—K-6 **Controllers.**
30—K-10 **Controllers.**
20—K-11 **Controllers.**
10—K-28-B **Controllers.**

### Lathe

1 Pond Standard **Car wheel lathe,** motor driven, with variable speed motor, and with air cylinder attachment for removing and replacing wheels.

For further particulars apply to

**W. R. KERSCHNER COMPANY, INC.**
**50 Church Street, New York**

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## IMMEDIATE SHIPMENT

1—500 KW. General Electric Curtis steam turbine, 3 ph., 60 cy., 1800 rpm., 2300 volts, 150 lb. steam pressure, vertical type.
1—500 K.W. Westinghouse Horizontal Turbo Generating Unit wound for 3 phase, 60 cycle, 2300 volts, speed 3600 rpm., condensing duty.

### 25 Cycle Rotary Converters

2—150 KW. General Electric type T.C., 4-150-750, 25 cycle, 3 ph., 575 volt, rotary converters, 750 rpm., complete with end play and speed limit device.

### 200 Kilowatt 60 Cycle Rotary Converters

1—200 KW. Westinghouse 3 ph., 60 cy. rotary converters, 550 volts, 720 rpm., complete with 4—100 KW. Westinghouse Scott connected oil insulated transformers, 10,000/9500 volts prim., 430/362 volts secy.
1—150 KW. Westinghouse 3 ph., 60 cy., rotary converter, 550 volts, 720 rpm.

### Transformers

6—750 KVA. General Electric oil filled self cooled transformers, 4400/281 volts, with 4400-4290-4180-4070-2200-2090-1980 taps in the primary.
3—500 KW. General Electric, 60 cy., single phase transformers, 66,000 volts primary, 4400/2200 volts secondary.
3—375 KVA. Allis Chalmers O. I. S. C. indoor type transformers, 25 cy., 2300 v., 367 v. secy.
3—350 KVA. General Electric, type H, 60 cy., transformers 2400/2300/2200 v. prim., 200/400 v. secy.
1—100 KVA. General Electric, type H, 60 cy. transformer, 4600 volts prim., 115-230 volts secy.
4—100 KW. Westinghouse, oil insulated, Scott connected transformers, 10,000/9500 v. prim., 430/362 v. secy.
3—75 KW. Westinghouse 60 cy. transformers, 2200 v. prim., 110/220/440 v. secy.
3—50 KVA. General Electric type H, 60 cy. transformers, 900/1000/16000 v. prim. Y., 230/460 v. secy.
Also a stock of smaller sized transformers.

**IMMEDIATE DELIVERY**

**ARCHER & BALDWIN, Inc.**
**114-118 Liberty Street New York City**
**TELEPHONE 4337-4338 RECTOR**

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### FREQUENCY CHANGERS

4 1000 KW. SETS:
  Generators: 3 ph., 60 cy., 4500-2300 volts, 300 RPM.
  Motors: 1050 Kva., 3 ph., 25 cy., 6600 volts, 300 RPM.
  Exciters: Direct connected.
  Switchboards: With necessary instruments.
1 100 KW. SET:
  Generator: Sgle. ph., 60 cycle, 2300 volts, 720 RPM.
  Motor: 150 HP., 3 ph., 25 cy., 2300 volts, 720 RPM.
  Exciter: 5 KW., direct connected.

### ROTARY CONVERTERS AND MOTOR GENERATOR SETS—25 Cycles

1 600 KW. Gen. Elec., TC-A, 3 ph., 600 volt, D.C., 375 volt A.C., 8 pole, 375 RPM.
1 600 KW. set consisting of two 300 KW. 6 pole generators, 550 volts, 600 amps., dir. conn. to one 750 HP. synchronous motor, 3 ph., 25 cy., 6600 volt, 500 RPM., complete with AC and DC panels.
4 500 KW. Gen. Elec., HC-K, 600 volt D.C., 4 pole, 750 RPM., each rotary complete with three 165 Kva. Gen. Elec. OI SC Transformers, HP-RP, 6600/5940 volts prim., 430/286/143 volts sec., also necessary panels and instruments.
1 500 KW. Westg., 3 ph., 550 volt D.C., 390 volt A.C., 6 pole, 500 RPM., with dir. conn. starting motor AC and DC panels and three 175 KW. Westg. oil cooled transformers, 13,200 volts prim., 390 volts sec.

### ROTARY CONVERTERS—60 Cycles

1 500 KW. Westinghouse, 6 ph., 6 pole, 600 volts D.C., 424 volts A.C., 1200 RPM., complete with switchboard and three 185 Kva. Westg. OI SC transformers, single ph., 2300 volts high tension.
1 300 KW. Westinghouse, 525-575 volts D.C., 600 RPM., with two 165 KW. Westg. oil insulated transformers, 2200 volts primary, 367 volts secondary.
2 300 KW. Gen. Elec., type HC, form P, 8 pole, 3 ph., 60 cy., 600 volts D.C., 900 RPM. With each rotary there are three 110 KW. Gen. Elec. AB form B1 transformers. 13,200 volts primary, 430 volts sec., also panels with necessary instruments.

*Our new and complete list of steam and electrical equipment will be mailed upon request*

**MACGOVERN & COMPANY, Inc.**
**114 Liberty Street, New York City**

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## CARS FOR SALE

**OPEN and CLOSED**
**MOTOR and TRAIL**

Write for Price and Full Particulars to

**ELECTRIC EQUIPMENT CO.**
Commonwealth Bldg. Philadelphia, Pa.

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## It Would Be Almost a Miracle

if one or more of the 8,000 men who regularly receive the JOURNAL did not happen to want that used machine which you want to sell. The

## Searchlight Section

brings buyers and sellers together

Copy received until Wednesday noon for publication in the issue of that week

# SEARCHLIGHT SECTION

## FOR SALE

### Immediate Shipment

100 tons of 62 lb. Shanghai rails, together with bars, rails practically as good as new, ready for quick shipment. Wire for prices.

**M. K. FRANK**
**Frick Building, Pittsburgh, Pa.**

FOR SALE

16 W. H. 68

### Railway Motors

now running in good condition, with gears, pinions, cases, collars. Will release for delivery during month of July.

Also one set G. E. 1000 Armature Coils—and one 1200 G. E. new field coil.

**C. G. & W. St. Ry. Co.**
**Waynesboro, Penna.**

FOR SALE

### Engine and Generator

1—22x36, 450 H.P. Allis engine (Reliance Type), 125 rev.
1—300 K.W. belted Bullock generator, 550 volt, 200 RPM., 8 pole, 545 amps.
1—85 ft., 38 in. belt.

**Joplin & Pittsburg Railway Co.**
Pittsburgh, Kansas

### RAILS

673 tons, 100 lb., and angles, new.
350 tons, 94 lb., and angles, new.
160 tons, 80 lb., and angles, new. (A. S. C. E.)
2100 tons, 67½ lb., and angles, new. (5 in.)
565 tons, 60 lb., Shanghai and Splices, Relays. (6 in.)

**Railway Equipment**
What have you to offer?
**ZELNICKER IN ST. LOUIS**

### Armature Coil Taping Machine

**Saves Time, Labor and Money**

A boy can tape 40 coils for Westinghouse 12A Armature in an hour. Further particulars gladly furnished.

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40 Johnson registering fare boxes. In excellent operating condition. Greatly reduced prices. For immediate shipment address Nelson P. Hall, Sales Agency, 14 East Jackson Blvd., Chicago, Ill.

### IMMEDIATE SHIPMENT

1—300 K.W. Westinghouse, compound wound, 3 bearing, belt-driven

### Generator

speed 435 R.P.M., 550 volts.

**LEO A. PHILLIPS**
Steam & Electrical Equipment
90 West Street New York City

### 85 lb. A. S. C. E. Relayers

16,000 tons—with Angle Bars to match. Available immediate shipment and centrally located.
We positively own these Rails and offer same in carload lots and over.
25,000 tons—Relayers—sizes 25 lb. to 100 lb., in stock our Pittsburgh yards and vicinity.
Immediate shipment guaranteed and prices very attractive.
Carload and less than carload inquiries and orders solicited.
Rails cut to length for structural purposes.
Frogs, Switches, Bolts, Nuts, Spikes and all Accessories.

**L. B. FOSTER COMPANY**
Park Bldg. Pittsburgh, Pa.

**CLEVELAND ARMATURE WORKS**
Cleveland, Ohio

### Everything in the Line of Repairs to Electrical Machinery

Complete Armatures, New Armatures, Rewound Armature Cores, Armature Shafts, Armature Coils, Fields and Commutators.

Established 22 Years.

FOR SALE

Four G. E. 214-C, four

### Motor Equipments

complete for single end operation with multiple unit control. These equipments are in excellent condition, having been run only about 55,000 miles. We have no use for them—account of changing from 600 DC. to 1200 DC.

TEXAS ELECTRIC RAILWAY,
Dallas, Texas.

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### Wanted at Once

For immediate shipment any quantity of battery lead plates, sediment scrap copper and wire, brass and all other grades of scrap material. Write to us today for our prices. National Metal & Rubber Co., 31 India Wharf, Boston, Mass.

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AS superintendent, train master or chief train dispatcher, with a good interurban company. 17 years' experience in operating department of electric and steam railways. Best reference. P. W. 1542 (Utah), Elec. Ry. Journal, San Francisco.

ENGINEER executive desires position as manager of public utility. Technical graduate, 15 years' experience engineering, operating and executive positions. Good record and references. P. W. 1555, (Ill.) Elec. Ry. Jour., Chicago.

MAN, 45, with 25 years' accounting, traffic and operating experience, last 8 years' traffic and general manager small railroad, desires position with electric line. P. W., 1554 (Wis.), Elec. Ry. Journal, Chicago.

MASTER mechanic with 18 years' experience on high speed interurban and city, wishes to change position. Entirely competent to handle property and help and get good results; not afraid of a tough proposition. P. W., 1521 (Conn.), Elec. Ry. Journal.

OPERATING man, 45, with fifteen years' successful experience as Superintendent and General Superintendent, short line roads, open for engagement on steam or electric line. P. W. 1543 (Cal.), Elec. Ry. Journal, San Francisco.

SHOP foreman, married, 35, long practical experience; inspector, overhauling, all equipments, system, economy, wants to change. PW 1557 (Ohio), Elec. Ry. Journal, Chicago.

SUPERINTENDENT—Competent operating executive thoroughly conversant with modern practice. 20 years' experience in high-speed single track and city operation. Now employed, but desirous of assuming greater responsibilities. Correspondence solicited. P. W., 1535 (N. Y.), Elec. Ry. Journal, N. Y. C.

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ARMATURE winder and electrician familiar with general maintenance and capable of taking charge of rolling stock, small road, twelve cars. Give experience and salary. Married man preferred. P., 1531 (Mich.), Elec. Ry. Journal, Chicago.

DRAFTSMAN wanted for Master Mechanic's office. Must have good electrical and mechanical knowledge. State salary expected. Man over 31 years old preferred. P. 1544 (Pa.), Elec Ry. Journal, Philadelphia.

TRACK supervisor wanted for city and interurban road. Give details of past experience, together with age, salary expected and references in first letter. P., 1549 (Pa.), Elec. Ry. Journal, Phila.

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The undersigned provides a confidential service designed to locate openings through correspondence for men earning not less than $2,500 and up to $25,000; all lines. Not an employment agency, but a constructive, initiative service, covering individual negotiations. Established 1910. Complete privacy assured; present connections in no way jeopardized. Send name and address only for explanatory details. R. W. Bixby, 81 Niagara Square, Buffalo, N. Y.

# WHAT AND WHERE TO BUY

## Equipment, Apparatus and Supplies Used by the Electric Railway Industry with Names of Manufacturers and Distributors

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Davis-Bournonville Co.
Oxweld Acetylene Co.

**Advertising, Street Car.**
Collier, Inc., Barron G.

**Air Cleaners and Rectifiers.**
Horne Mfg. Co.

**Alloys, Steel & Iron (See also Bearings and Bearing Metals.)**
Titanium Alloy Mfg. Co.

**Anchors, Guy.**
Electric Service Supplies Co.
Holden & White, Inc.
Johns-Manville Co., H. W.
Ohio Brass Co.
Westinghouse Elec. & M. Co.

**Anti-Climbers.**
Railway Improv. Co.

**Automobiles and Buses.**
Brill Co., The J. G.

**Axle Straighteners.**
Columbia M. W. & M. I. Co.

**Axles.**
Bemis Car Truck Co.
Brill Co., The J. G.
Carnegie Steel Co.
National Railway Appliance Co.
National Tube Co.
St. Louis Car Co.
Standard Steel Works Co.
Taylor Electric Truck Co.
Westinghouse Elec. & M. Co.

**Baboitting Devices.**
Columbia M. W. & M. I. Co.

**Badges and Buttons.**
American Railway Supply Co.
Electric Service Supplies Co.
International Register Co., The.
Woodman Mfg. & Supply Co., R.

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Coal & Iron National Bank.
National City Co.

**Batteries, Dry.**
Johns-Manville Co., H. W.

**Batteries, Storage.**
Electric Storage Battery Co.

**Bearings and Bearing Metals.**
Bemis Car Truck Co.
Columbia M. W. & M. I. Co.
Eureka Co.
General Electric Co.
Kerschner Co., Inc., W. R.
Long Co., E. G.
More-Jones Brass & M. Co.
St. Louis Car Co.
Taylor Elec. Truck Co.
Westinghouse Elec. & M. Co.

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Baldwin Locomotive Works.
Holden & White, Inc.
Stucki Co., A.

**Bearings, Oil-less, Graphite, Bronze and Wood.**
Bound Brook Oil-less Bearing Co.

**Bearings, Roller and Ball.**
Gurney Ball Bearing Co.
Hess-Bright Mfg. Co.
Railway Roller Bearing Co.

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Brill Co., The J. G.
Columbia M. W. & M. I. Co.
Electric Service Supplies Co.
St. Louis Car Co.

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Niles-Bement-Pond Co.
Watson-Stillman Co.
Zelnicker Supply Co., W. A.

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Du Pont de Nemours & Co., E. I.

**Boiler Cleaning Compounds.**
Dearborn Chemical Co.
Johns-Manville Co., H. W.

**Boiler Coverings.**
Johns-Manville Co., H. W.

**Boiler Graphite.**
Dixon Crucible Co., Joseph.

**Boiler Tubes.**
National Tube Co.

**Boilers.**
Babcock & Wilcox Co.

**Bond Testers.**
American Steel & Wire Co.

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Electric Railway Improve. Co.
Lincoln Bonding Co.
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Electric Railway Improve. Co.
Electric Service Supplies Co.
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General Electric Co.
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Lincoln Bonding Co.
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General Electric Co.
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St. Louis Car Co.
Safety Car Devices Co.
Taylor Elec. Truck Co.
Westinghouse Trac. Brake Co.

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General Electric Co.
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**Bushings, Case Hardened Manganese.**
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**Bushings, Fibre.**
Diamond State Fibre Co.

**Bushings, Graphite & Wooden.**
Bound Brook Oil-less Bearing Co.

**Cables. (See Wires and Cables.)**

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**Car Trimmings. (For Curtains, Doors, Seats, etc., see those Headings.)**

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American Car Co.
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Jewett Car Co.
Kuhlman Car Co., G. C.
St. Louis Car Co.
Stephenson Co., John.
Wason Mfg. Co.

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Electric Equipment Co.
Kerschner Co., Inc., W. R.

**Cars, Self-Propelled.**
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General Electric Co.

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Eureka Co.
Frankel Connector Co.
Horne Mfg. Co.
More-Jones Brass & M. Co.

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American Bridge Co.
American Steel Foundries.
Bemis Car Truck Co.
Columbia M. W. & M. I. Co.
Horne Mfg. Co.
Long Co., E. G.
St. Louis Car Co.
Standard Steel Works Co.
Union Spring & Mfg. Co.

**Castings, Malleable and Brass.**
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Bemis Car Truck Co.
Columbia M. W. & M. I. Co.
Horne Mfg. Co.
Long Co., E. G.
St. Louis Car Co.

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Kerschner Co., Inc., W. R.
Long Co., E. G.
Ohio Brass Co.
Trolley Supply Co.
Wood Co., C. N.

**Ceiling, Car.**
Keyes Products Co.
Pantasote Co., The.

**Checks, Employees.**
American Railway Supply Co.

**Chemists.**
Little, Inc., Arthur D.

**Circuit Breakers.**
Cutter Electrical & Mfg. Co.
General Electric Co.
Westinghouse Elec. & M. Co.

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Electric Service Supplies Co.
Frankel Connector Co.
General Electric Co.
Hubbard & Co.
Klein & Sons, M.
Ohio Brass Co.
Westinghouse Elec. & M. Co.

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Ohio Brass Co.

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**Coil Banding and Winding Machines.**
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D & W Fuse Co.
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General Electric Co.
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**Coin-Counting Machines.**
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International Register Co.
Johnson Fare Box Co.

**Commutator Slotters.**
Electric Service Supplies Co.
General Electric Co.
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Wood Co., C. N.

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General Electric Co.

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Coil Mfg. & Repair Co.
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Eureka Co.
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Westinghouse Trac. Brake Co.

**Condensers.**
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Columbia M. W. & M. I. Co.
Electric Service Supplies Co.
General Electric Co.
Horne Mfg. Co.
Johns-Manville Co., H. W.
Kerschner Co., Inc., W. R.
Westinghouse Elec. & M. Co.

**Controlling Systems.**
General Electric Co.
Westinghouse Elec. & M. Co.

**Converters, Rotary.**
General Electric Co.
Westinghouse Elec. & M. Co.

**Conveying and Hoisting Machinery.**
American Bridge Co.
Columbia M. W. & M. I. Co.
Green Eng'g Co.

**Cord, Bell, Trolley, Register, etc.**
Brill Co., The J. G.
Electric Service Supplies Co.
International Register Co., The.
Long Co., E. G.
Roebling's Sons Co., John A.
Samson Cordage Works.
Trolley Supply Co.

**Cord Connectors and Couplers.**
Electric Service Supplies Co.
Samson Cordage Works.
Wood Co., C. N.

**Couplers, Car.**
Brill Co., The J. G.
Long Co., E. G.
Ohio Brass Co.
Van Dorn Coupler Co.
Westinghouse Trac. Brake Co.

**Couplings, Conduit.**
Horne Mfg. Co.

**Cranes. (See also Hoists.)**
Niles-Bement-Pond Co.

**Creoseting. (See Wood Preservatives.)**

**Cross Arms. (See Brackets.)**

**Crossing Foundations.**
International Steel Tie Co.

**Crossing Signals. (See Signals, Crossing.)**

**Crossings, Track. (See Track, Special Work.)**

**Culverts.**
American Rolling Mill Co.
Bark River B. & Culvert Co.
California Cor. Culvert Co.
Canada Ingot & Iron Co., Ltd.
Canton Culvert & Silo Co.
Coast Culvert & Flume Co.
Corrugated Culvert Co.
Delaware Metal Culvert Co.
Dixie Culvert & Metal Co.
Hardesty Mfg. Co., R.
Illinois Corrugated Metal Co.
Independence Culvert Co.
Iowa Pure Iron Culvert Co.
Kentucky Culvert Mfg. Co.
Lee-Arnett Co.
Lone Star Culvert Co.
Lyle Corrugated Culvert Co.
Michigan Bridge & Pipe Co.
Montana Culvert Co.
Nebraska Culvert & Mfg. Co.
Nevada Metal Mfg. Co.
New England Metal Cul. Co.
North East Metal Co.
Northwestern Sheet & I. Wks.
O'Neall Co., W. Q.

**Standing the Overload**

What's the usual result of an overload on your car motors or compressors?

A puff of smoke—followed by a trip to the repair shop. You can eliminate these trips by using

**Salamander Fireproof Wire**

motor field, armature and compressor coils. You can't burn out Salamander Wire Coils. We've had them red-hot on test without any breakdown.

*Send for samples and catalogs.*

**Independent Lamp & Wire Co., Inc.**

Offices:
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FACTORIES:
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**For General Testing**

in Electric Power Plants, or for Outdoor Work

**Weston**

Model 45

**D. C. Portable Ammeters and Voltmeters**

Designed to meet the demand for a medium-priced Ammeter and Voltmeter. Their accuracy is guaranteed within 1 per cent.

They are shielded from the influence of external magnetic fields, the movement and magnetic system being enclosed in an iron case permanently mounted in a handsome wooden carrying-box with hinged cover.

The scale has a mirror over which the knife-edge pointer travels. Readings can be made within 1/10 of a division at any part of the scale.

In mechanical and electrical workmanship the Weston Model 45 Portable Ammeters and Voltmeters practically attain perfection.

A full description will be found in Bulletin 501, which will be mailed to you on request.

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All-Steel
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Car

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*SELLING AGENTS FOR*

Tool Steel Gears and Pinions
Johnson Fare Box
Perry Side Bearings
Hartman Centering Center Plates
Wasson Trolley Bases
Garland Ventilator
Electric Arc Welders
High Class Railway Varnishes and Enamels
Elastic Car Waste

Special Agents for { Tool Steel Gear & Pinion Co.
Johnson Fare Box Co.
C. & C. Electric & Mfg. Co.
Holden & White

General Agents for Anglo-American Varnish Co.
Eastern Agents for Union Fibre Co.

Ohio Corrugated Culvert Co.
Pennsylvania Metal Cul. Co.
Road Supply & Metal Co.
Sioux Falls Metal. Cul. Co.
Spokane Corr. Cul. Co.
Tennessee Metal Culvert Co.
Utah Corr. Cul. & Flume Co.
Virginia Metal & Culvert Co.
Western Metal Mfg. Co.
Wyatt Mfg. Co.

**Curtains and Curtain Fixtures.**
Brill Co., The J. G.
Du Pont Fabrikoid Co.
Edwards Co. Inc., The O. M.
Electric Service Supplies Co.
Hartshorn Company, Stewart.
Pantasote Co., The.
St. Louis Car Co.

**Cutting Apparatus, Oxy-Acetylene.**
Davis-Bournonville Co.
Oxweld Acetylene Co.

**Derailing Devices.**
Cleveland Frog & Crossing Co.

**Destination Signs.**
Columbia M. W. & M. I. Co.
Creaghead Engrg. Co.
Electric Service Supplies Co.

**Detective Service.**
Wisch Service, P. Edward.

**Dispatching Systems.**
Simmen Auto. Ry. Sig. Co.

**Door Operating Devices.**
Consolidated Car-Heating Co.
National Pneumatic Co.
Safety Car Devices Co.

**Doors, Asbestos.**
Johns-Manville Co., H. W.

**Doors and Door Fixtures.**
Brill Co., The J. G.
Edwards Co., Inc., The O. M.
Hale & Kilburn Co.

**Doors, Folding Vestibule.**
National Pneumatic Co.

**Doors, Steel Rolling.**
Kinnear Mfg. Co.

**Doors, Trap.**
Edwards Co., The O. M.

**Draft Rigging. (See Couplers, Car.)**

**Drills, Track.**
American Steel & Wire Co.
Electric Service Supplies Co.
Long Co., E. G.
Niles-Bement-Pond Co.
Ohio Brass Co.

**Dryers, Sand.**
Electric Service Supplies Co.
Zelnicker Supply Co., W. A.

**Engineers, Consulting, Contracting and Operating.**
Archbold-Brady Co.
Arnold Co., The.
Beeler, John A.
Burch, Edw. P.
Byllesby & Co., H. M.
Ford, Bacon & Davis.
Hunt & Co., Robert W.
Jackson, D. C. & Wm. B.
Little, Inc., Arthur D.
Neiler, Rich & Co.
Richey, Albert S.
Sanderson & Porter.
Sargent & Lundy.
Scofield Engineering Co.
Stephenson Sons & Co., S.
Stone & Webster Eng'g Corp.
White Companies, The J. G.
Woodmansee & Davidson, Inc.

**Engines, Gas and Oil.**
Westinghouse Elec. & M. Co.

**Engines, Steam.**
Westinghouse Elec. & M. Co.

**Extension Platform Trap Doors.**
Edwards Co., Inc., The O. M.

**Fare Boxes.**
Brill Co., The J. G.
Cleveland Fare Box Co.
International Register Co., The.
Johnson Fare Box Co.
Ohmer Fare Register Co.

**Fences, Woven Wire and Fence Posts.**
American Steel & Wire Co.
Page Woven Wire Fence Co.

**Fenders and Wheel Guards.**
Brill Co., The J. G.
Cleveland Fare Box Co.
Consolidated Car Fender Co.
Electric Service Supplies Co.
Horne Mfg. Co.
Star Brass Works.
Trolley Supply Co.

**Fibre and Fibre Tubing.**
Diamond State Fibre Co.
Johns-Manville Co., H. W.
Westinghouse Elec. & M. Co.

**Fibre Insulation.**
National Ry. Appliance Co.

**Field Coils. (See Coils.)**

**Filters, Water.**
Scaife & Sons Co., Wm. B.

**Fire Extinguishing Apparatus.**
Johns-Manville Co., H. W.

# WHAT AND WHERE TO BUY

**Fire-Proofing Material.**
Johns-Manville Co., H. W.

**Flooring, Composition.**
American Mason Safety T. Co.
Johns-Manville Co., H. W.

**Forgings.**
Columbia M. W. & M. I. Co.
Eureka Co.
Standard Steel Works Co.

**Furniture, Metal Office.**
Edwards Co., Inc., The O. M.

**Fuses and Fuse Boxes.**
Chicago Fuse Mfg. Co.
Columbia M. W. & M. I. Co.
D & W Fuse Co.
Daum, A. F.
General Electric Co.
Johns-Manville Co., H. W.
Westinghouse Elec. & M. Co.

**Fuses, Refillable.**
Columbia M. W. & M. I. Co.
Economy Fuse & Mfg. Co.
General Electric Co.
Horne Mfg. Co.

**Gages, Oil and Water.**
Ohio Brass Co.

**Gaskets.**
Diamond State Fibre Co.
Johns-Manville Co., H. W.
Power Specialty Co.

**Gas-Electric Cars.**
General Electric Co.

**Gas Producers.**
Westinghouse Elec. & M. Co.

**Gates, Car.**
Brill Co., The J. G.
Jewett Car Co.

**Gear Blanks.**
Carnegie Steel Co.
Diamond State Fibre Co.
Standard Steel Wks. Co.

**Gear Cases.**
Columbia M. W. & M. I. Co.
Electric Service Supplies Co.
Kerschner Co., Inc., W. R.
National Ry. Appliance Co.
Westinghouse Elec. & M. Co.

**Gears and Pinions.**
Bemis Car Truck Co
Columbia M. W. & M. I. Co.
Diamond State Fibre Co.
Electric Service Supplies Co.
General Electric Co.
Kerschner Co., Inc., W. R.
Long Co., E. G.
National Ry. Appliance Co.
Nuttall Co., R. D.

**Generating Sets, Gas-Electric.**
General Electric Co.

**Generators.**
Dick, Kerr & Co.
General Electric Co.
Westinghouse Elec. & M. Co.

**Gongs. (See Bells and Gongs.)**

**Graphite.**
Dixon Crucible Co., Joseph.
Morgan Crucible Co.

**Grates, Chain.**
Green Eng'g Co.

**Greases. (See Lubricants.)**

**Grinders and Grinding Supplies.**
General Electric Co.
Railway Track-work Co.

**Grinding Blocks & Wheels.**
Norton Co.

**Guards, Cattle.**
American Bridge Co.

**Guards, Trolley.**
Electric Service Supplies Co.
Ohio Brass Co.

**Harps, Trolley.**
Anderson M. Co., A. & J. M.
Bayonet Trolley Harp Co.
Electric Service Supplies Co.
Hensley Trolley & Mfg. Co.
More-Jones Brass & M. Co.
Nuttall Co., R. D.
Star Brass Works.

**Headlights.**
Electric Service Supplies Co.
General Electric Co.
Long Co., E. G.
Ohio Brass Co.
St. Louis Car Co.
Trolley Supply Co.
Westinghouse Elec. & M. Co.

**Headlinings.**
Kerschner Co., Inc., W. R.
Keyes Products Co.
Pantasote Co., The.

**Heaters, Car, Electric.**
Consolidated Car-Heating Co.
Gold Car Heating & Lighting Co.
Smith Heater Co., Peter.

**Heaters, Car, Hot Air and Water.**
Cooper Heater Co.
Smith Heater Co., Peter.

**Heaters, Car, Stove.**
Electric Service Supplies Co.
Smith Heater Co., Peter.

**Hoists and Lifts.**
Columbia M. W. & M. I. Co.
Duff Manufacturing Co.
Ford Chain Block & Mfg. Co.
Niles-Bement-Pond Co.
Yale & Towne Mfg. Co.

**Hose Bridges.**
Ohio Brass Co.

**Hose, Pneumatic & Fire.**
Johns-Manville Co., H. W.

**Hydraulic Machinery.**
Niles-Bement-Pond Co.
Watson-Stillman Co.

**Hydrogrounds.**
Horne Mfg. Co.

**Inspection.**
Elec'l Testing Laboratories.
Hunt & Co., Robert W.

**Instruments, Measuring, Testing and Recording.**
General Electric Co.
Johns-Manville Co., H. W.
Sangamo Electric Co.
Westinghouse Elec. & M. Co.
Weston Elec'l Instrument Co.

**Insulating Cloths, Paper and Tape.**
Anchor Webbing Co.
Diamond State Fibre Co.
General Electric Co.
Hope Webbing Co.
Johns-Manville Co., H. W.
Mechanical Rubber Co.
Mica Insulator Co.
Okonite Co.
Packard Electric Co.
Standard Paint Co.
Standard Underground Cable Co.
Standard Woven Fabric Co.
Westinghouse Elec. & M. Co.

**Insulation. (See also Paints.)**
Anderson M. Co., A. & J. M.
Diamond State Fibre Co.
Electric Service Supplies Co.
General Electric Co.
Holden & White Inc.
Johns-Manville Co., H. W.
Mechanical Rubber Co.
Okonite Co.
Westinghouse Elec. & M. Co.

**Insulators. (See also Line Material.)**
Anderson M. Co., A. & J. M.
Creaghead Engrg. Co.
Drew Elec. & Mfg. Co.
Electric Ry. Equipment Co.
Electric Service Supplies Co.
General Electric Co.
Johns-Manville Co., H. W.
Macallen Co.
Ohio Brass Co.
Westinghouse Elec. & M. Co.
White Elec. Supply Co., T. C.

**Insulator Pins.**
Hubbard & Co.

**Insurance, Fire.**
Marsh & McLennan.

**Inventions, Developed and Perfected.**
Peters & Co., G. D.

**Jacks. (See also Cranes, Hoists and Lifts.)**
Brill Co., The J. G.
Buckeye Jack Mfg. Co.
Columbia M. W. & M. I. Co.
Duff Manufacturing Co.
National Ry. Appliance Co.
Watson-Stillman Co.

**Joints, Rail.**
Atlantic Welding Co.
Carnegie Steel Co.
Rail Joint Co., The.
Zelnicker Supply Co., W. A.

**Journal Boxes.**
Bemis Car Truck Co.
Brill Co., The J. G.
Gurney Ball Bearing Co.
Hess-Bright Mfg. Co.
Long Co., E. G.
Railway Roller Bearing Co.

**Junction Boxes.**
Johns-Manville Co., H. W.
Standard Underground Cable Co.

**Laboratories.**
Elec'l Testing Laboratories.
Little, Inc., Arthur D.

**Lamp Guards and Fixtures.**
Anderson M. Co., A. & J. M.
Electric Service Supplies Co.
General Electric Co.
Westinghouse Elec. & M. Co.

**Lamps, Arc and Incandescent.**
Anderson M. Co., A. & J. M.
General Electric Co.
Westinghouse Elec. & M. Co.

**Lamps, Signal and Marker.**
Ohio Brass Co.

**Lathes, Car Wheel.**
Niles-Bement-Pond Co.

**Lighting Regulators, Car.**
Holden & White, Inc.

**Lightning Protection.**
Anderson M. Co., A. & J. M.
Electric Service Supplies Co.
General Electric Co.
Horne Mfg. Co.
Ohio Brass Co.
Westinghouse Elec. & M. Co.

**Line Material. (See also Brackets, Insulators, Wires, etc.)**
Anderson M. Co., A. & J. M.
Archbold-Brady Co.
Columbia M. W. & M. I. Co.
Creaghead Engrg. Co.
Diamond State Fibre Co.
Dick, Kerr & Co.
Drew Elec. & Mfg. Co.
Electric Ry. Equipment Co.
Electric Service Supplies Co.
Eureka Co.
General Electric Co.
Holden & White, Inc.
Hubbard & Co.
Johns-Manville Co., H. W.
Macallen Co.
More-Jones Brass & M. Co.
Ohio Brass Co.
Westinghouse Elec. & M. Co.
White Elec. Supply Co., T. C.

**Lockers, Metal.**
Edwards Co., Inc., The O. M.

**Locks.**
Yale & Towne Mfg. Co.

**Locomotives, Electric.**
Baldwin Locomotive Works.
Brill Co., The J. G.
General Electric Co.
Westinghouse Elec. & M. Co.

**Lubricants, Oil and Grease.**
Borne, Scrymser Co.
Dearborn Chemical Co.
Dixon Crucible Co., Jos.

**Lumber. (See Poles, Ties, Posts, etc.)**

**Machine Work.**
Columbia M. W. & M. I. Co.
Horne Mfg. Co.

**Machine Tools.**
Columbia M. W. & M. I. Co.
Niles-Bement-Pond Co.
Watson-Stillman Co.

**Manganese Parts.**
Bemis Car Truck Co.

**Mats.**
Johns-Manville Co., H. W.

**Meters, Car, Watthour.**
Sangamo Electric Co.

**Meters. (See Instruments.)**

**Mica.**
Drew Elec. & Mfg. Co.
Long Co., E. G.
Macallen Co.

**Motormen's Seats.**
Electric Service Supplies Co.
Wood Co., C. N.

**Motor Generator, Bonding and Welding.**
Lincoln Bonding Co.

**Motors and Generators Sets.**
General Electric Co.

**Motors, Electric.**
Br. Westinghouse E. & M. Co.
Dick, Kerr & Co.
General Electric Co.
Westinghouse Elec. & M. Co.

**Nuts and Bolts.**
Bemis Car Truck Co.
Columbia M. W. & M. I. Co.
Hubbard & Co.
Long Co., E. G.
National Ry. Appliance Co.
Roller Lock Nut Co.

**Oils. (See Lubricants.)**

**Overhead Equipment. (See Line Material.)**

**Oxy-Acetylene. (See Cutting Apparatus, Oxy-Acetylene.)**

**Packing.**
Diamond State Fibre Co.
Electric Service Supplies Co.
Horne Mfg. Co.
Johns-Manville Co., H. W.
Mechanical Rubber Co.
Power Specialty Co.

**Packing Rings.**
Johns Manville Co., H W.

**Paints and Varnishes. (Insulating.)**
General Electric Co.
Holden & White, Inc.
Johns-Manville Co., H. W.
Long Co., E. G.

TRADE B MARK

Barrett's PAVING PITCH

The Standard Paving Pitch

NOT every pitch is suitable for paving. Roofing-pitch, for example, would not do at all, although it looks much the same and contractors sometimes attempt to use it, on the theory that it is the same thing.

A good paving-pitch will last as long as the pavement—that is to say, twenty or thirty years—and at the end of that time it will be exactly as good as new and fit to use once more in a new pavement if it were worth while to take it off the old blocks.

The Barrett Company has been manufacturing Paving Pitch for something like forty years. We can photograph almost any old pitch-filled pavement and be fairly certain that when we look it up we will find that the pitch in the joints is a Barrett product of a generation ago.

Contractors who use Barrett's Paving Pitch know that it does not bubble and boil over in the kettle. That means that it is free from water and the lighter oils. They find that it holds its heat well and is easily handled by unskilled labor. They find that when hot it is just the right consistency to flow easily into the joints and form a waterproof seal, without, on the other hand, being so liquid that it runs through to the gutters. In short, they find that Barrett's Paving Pitch is made especially for their use with all their practical difficulties in mind.

The municipal engineer who specifies Barrett's Paving Pitch knows that he can identify the goods by the label on the job. He knows that he is getting a standard product with forty years of experience to back it up; he knows that it is the same material that has made good in lots of other pavements which he knows of elsewhere.

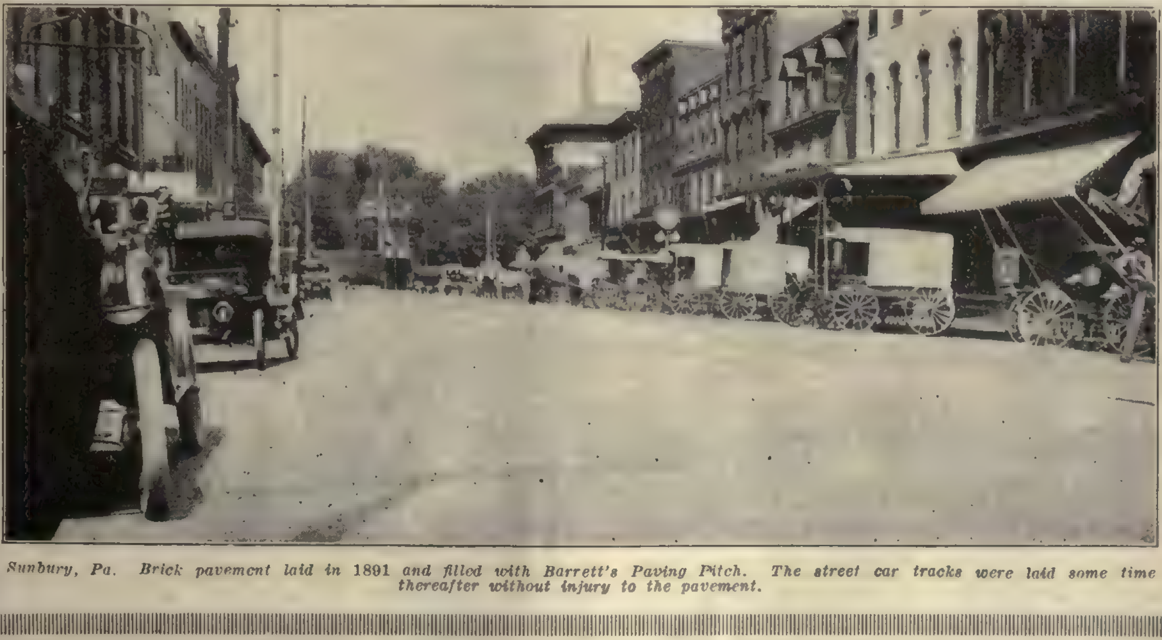
In preferring pitch to cement or sand, the municipal engineer knows that he will get a pavement where every joint is an *expansion-joint;* a pavement in which cracks, breaks, blow-outs are unknown and impossible; a pavement that will not expand and thrust the curbing out of line or damage tracks or manholes; a pavement, in short, that will always be a credit to his management.

The standard pitch is Barrett's Paving Pitch. Look for the label on the barrels.

*Booklets on request. Address our nearest office.*

**The Barrett Company**

New York Chicago Philadelphia Boston St. Louis
Cleveland Cincinnati Pittsburgh Detroit Birmingham
Kansas City Minneapolis Nashville Salt Lake City Seattle Peoria
THE PATERSON MANUFACTURING CO., Limited: Montreal Toronto
Winnipeg Vancouver St. John, N. B. Halifax, N. S. Sydney, N.S.



*Sunbury, Pa. Brick pavement laid in* 1891 *and filled with Barrett's Paving Pitch. The street car tracks were laid some time thereafter without injury to the pavement.*

Mica Insulator Co.
Packard Electric Co.
Standard Paint Co.

**Paints and Varnishes. (Preservative.)**
Dixon Crucible Co., Jos.
Johns-Manville Co., H. W.
Long Co., E. G.
National Ry. Appliance Co.
Standard Paint Co.

**Paints and Varnishes for Woodwork.**
National Railway Appliance Co.

**Paving Brick. (Filler and Stretcher.)**
Nelsonville Brick Co.

**Paving Material.**
American B. S. & Fdy. Co.
Barrett Co., The.
Nelsonville Brick Co.

**Paving Pitch.**
Barrett Co., The.

**Pickups. (Trolley Wire.)**
Electric Service Supplies Co.
Ohio Brass Co.

**Pinion Pullers.**
Columbia M. W. & M. I. Co.
Electric Service Supplies Co.
General Electric Co.
Wood Co., C. N.

**Pinions. (See Gears.)**

**Pins, Case Hardened, Wood and Iron.**
Bemis Car Truck Co.
Electric Service Supplies Co.
Long Co., E. G.
Ohio Brass Co.

**Pipe.**
National Tube Co.

**Pipe Fittings.**
National Tube Co.
Power Specialty Co.
Standard Steel Works Co.
Watson-Stillman Co.

**Poles, Metal Street.**
Bates Expanded Steel Truss Co.
Electric Ry. Equipment Co.
Hubbard & Co.
National Railway Appliance Co.
National Tube Co.

**Pole Sleeves.**
Drew Elec. & Mfg. Co.

**Poles, Ties, Posts, Piling and Lumber.**
Carney & Co., B. J.
Lindsley Bros. Co.
Page & Hill Co.
Valentine-Clark Co.

**Poles and Ties, Treated.**
Lindsley Bros. Co.
Page & Hill Co.
Valentine-Clark Co.

**Poles, Trolley.**
Anderson M. Co., A. & J. M.
Bayonet Trolley Harp Co.
Columbia M. W. & M. I. Co.
Electric Service Supplies Co.
Long Co., E. G.
National Tube Co.
Nuttall Co., R. D.

**Pole Reinforcing.**
Hubbard & Co.

**Potheads.**
Okonite Co.

**Power Saving Devices.**
Arthur Power-Saving Recorder Co.

**Pressure Regulators.**
General Electric Co.
Ohio Brass Co.

**Pumps.**
Watson-Stillman Co.

**Punches, Ticket.**
American Railway Supply Co.
Bonney-Vehslage Tool Co.
International Register Co., The.
Wood Co., C. N.
Woodman Mfg. & Supply Co., R.

**Punching Machinery.**
Watson-Stillman Co.

**Purifiers, Feed Water.**
Scaife & Sons Co., Wm. B.

**Rail Grinders. (See Grinders.)**

**Rails, Relaying.**
Zelnicker Supply Co., W. A.

**Rail Welding. (See Welding Processes and Apparatus.)**

**Rattan.**
Brill Co., The J. G.
Electric Service Supplies Co.
Hale & Kilburn Co.
Jewett Car Co.
St. Louis Car Co.

**Recorders, Power Saving.**
Arthur Power-Saving Recorder Co.

**Registers and Fittings.**
Bonham Recorder Co.
Brill Co., The J. G.
Electric Service Supplies Co.
International Register Co., The.
Long Co., E. G.
Ohmer Fare Register Co.
Rooke Automatic Register Co.

# WHAT AND WHERE TO BUY

**Reinforcing Concrete.**
American Steel & Wire Co.

**Repair Shop Appliances. (See also Coil Banding and Winding Machines.)**
Columbia M. W. & M. I. Co.
Electric Service Supplies Co.

**Repair Work. (See also Coils, Armature and Field.)**
Cleveland Armature Works.
Coil Mfg. & Repair Co.
Columbia M. W. & M. I. Co.
General Electric Co.
Independent Lamp & W. Co.
Westinghouse Elec. & M. Co.

**Replacers, Car.**
Columbia M. W. & M. I. Co.
Electric Service Supplies Co.

**Resistance, Grid.**
Columbia M. W. & M. I. Co.
Ellcon Co.

**Resistance, Wire and Tube.**
General Electric Co.
Westinghouse Elec. & M. Co.

**Retrievers, Trolley. (See Catchers and Retrievers, Trolley.)**

**Rheostats.**
Ellcon Co.
General Electric Co.
Mica Insulator Co.
Westinghouse Elec. & M. Co.

**Roofing, Building.**
Barrett Co., The
Johns-Manville Co., H. W.
Standard Paint Co.

**Roofing, Car.**
Johns-Manville Co., H. W.
Keyes Products Co.
Pantasote Co., The.

**Rubber Specialties of all Kinds.**
Mechanical Rubber Co.

**Sand Blasts.**
National Ry. Appliance Co.

**Sanders, Track.**
Brill Co., The J. G.
Cleveland Fare Box Co.
Columbia M. W. & M. I. Co.
Electric Service Supplies Co.
Holden & White, Inc.
Horne Mfg. Co.
Jewett Car Co.
Ohio Brass Co.
St. Louis Car Co.

**Sash Balances.**
Edwards Co., Inc., The O. M.

**Sash Fixtures, Car.**
Brill Co., The J. G
Edwards Co., Inc., The O. M.

**Sash, Metal, Car Windows.**
Edwards Co., Inc., The O. M.
Hale & Kilburn Co.

**Scales, Weights, Balances and Dynamometers.**
Horne Mfg. Co.

**Seating Material. (See also Rattan.)**
Brill Co., The J. G.
Du Pont Fabrikoid Co.
Pantasote Co., The.

**Seats, Car.**
Brill Co., The J. G.
Hale & Kilburn Co.
Jewett Car Co.
Peters & Co., G. D.
St. Louis Car Co.

**Second-Hand Equipment. (See also pages 82, 83.)**
Archer & Baldwin.
Kerschner Co., Inc., W. R.
MacGovern & Co.

**Shade Rollers.**
Hartshorn Co., Stewart.

**Shades, Vestibule.**
Brill Co., The J. G.
Electric Service Supplies Co.

**Shovels.**
Hubbard & Co.

**Signals, Car Starting.**
Consolidated Car-Heating Co.
National Pneumatic Co.

**Signals, Highway Crossing.**
Electric Service Supplies Co.
Simmen Auto. Ry. Signal Co.
U. S. Electric Signal Co.

**Signal Systems, Block.**
Electric Service Supplies Co.
Federal Signal Co.
Simmen Auto Ry. Signal Co.
Union Switch & Signal Co.
U. S. Electric Signal Co.
Wood Co., C. N.

**Slack Adjusters. (See Brake Adjusters.)**

**Sleet Wheels and Cutters.**
Anderson M. Co., A. & J. M.
Bayonet Trolley Harp Co.
Bonney-Vehslage Tool Co.
Columbia M. W. & M. I. Co.
Drew Elec. & Mfg. Co.
Holden & White, Inc.
More-Jones Brass & M., Co.
Nuttall Co., R. D.

**Snow-Plows, Removers, Sweepers, etc.**
Brill Co., The J. G.
Columbia M. W. & M. I. Co.
Consolidated Car Fender Co.

**Soldering and Brazing Apparatus. (See Welding Proc. & App.)**

**Speed Indicators.**
Johns-Manville Co., H. W.
Wood Co., C. N.
Woodman Mfg. & Supply Co., R.

**Spikes.**
American Steel & Wire Co.

**Splicing Compounds.**
Johns-Manville Co., H. W.
Mechanical Rubber Co.
Standard Woven Fabric Co.
Westinghouse Elec. & M. Co.

**Splicing Sleeves. (See Clamps and Connectors.)**

**Springs, Car & Truck.**
American Steel Foundries.
American Steel & Wire Co.
Bemis Car Truck Co.
Brill Co., The J. G.
Long Co., E. G.
Standard Steel Works Co.
Taylor Elec. Truck Co.
Union Spring & Mfg. Co.

**Sprinklers, Track and Road.**
Brill Co., the J. G.
St. Louis Car Co.

**Steps, Car.**
American Mason S. T. Co.
Universal Safety Tread Co.

**Stokers, Mechanical.**
Babcock & Wilcox Co.
Green Engrg. Co.
Murphy Iron Works.
Westinghouse Elec. & M. Co.

**Storage Batteries. (See Batteries, Storage.)**

**Straps, Car, Sanitary.**
Holden & White, Inc.
Railway Improvement Co.

**Structural Iron. (See also Bridges.)**

**Sub-Stations.**
Delta Star Electric Co.

**Superheaters.**
Babcock & Wilcox.
Power Specialty Co.

**Sweepers, Snow. (See Snow-Plows, Sweepers and Brooms.)**

**Switchstands.**
Kilby Frog & Switch Co.
Ramapo Iron Works.

**Switches, Track. (See Track, Special Work.)**

**Switches and Switchboards.**
Anderson M. Co., A. & J. M.
Cutter Electrical & Mfg. Co.
Delta Star Electric Co.
Electric Service Supplies Co.
General Electric Co.
U. S. Electric Signal Co.
Westinghouse Elec. & M. Co.

**Tampers, Tie.**
Ingersoll-Rand Co.

**Tapes & Cloth. (See Insulating Cloths, Paper and Tape.)**

**Telephones and Parts.**
Electric Service Supplies Co.

**Terminals.**
Frankel Connector Co.

**Terminal Cables.**
Standard Underground Cable Co.

**Testing Clips.**
Frankel Connector Co.

**Testing, Commercial and Electrical.**
Electrical Testing Laboratories.
Hunt & Co., Robert W.

**Testing Instruments. (See Instruments, Electrical, Measuring, Testing.)**

**Thermostats.**
Consolidated Car-Heating Co.
Gold Car Heating & Lighting Co.
Railway Utility Co.
Smith Heater Co., Peter.

**Ticket Boxes.**
Macdonald Ticket & Ticket Box Co.

**Ticket Choppers and Destroyers.**
Electric Service Supplies Co.
Patten Co., Paul B.

**Tickets and Transfers.**
American Railway Supply Co.

**Ties and Tie Rods, Steel.**
American Bridge Co.
Carnegie Steel Co.
International Steel Tie Co.

**Ties, Wood. (See Poles, Ties, etc.)**

**Tools, Track and Miscellaneous.**
American Steel & Wire Co.
Columbia M. W. & M. I. Co.
Electric Service Supplies Co.
Johns-Manville Co., H. W.
Klein & Sons, M.
Railway Track-work Co.

**Torches, Acetylene. (See Cutting Apparatus, Oxy-Acetylene.)**

**Towers and Transmission Structures.**
American Bridge Co.
Archbold-Brady Co.
Bates Expanded Steel Truss Co.
Delta Star Electric Co.
Westinghouse Elec. & M. Co.

**Tower Wagons and Auto-Trucks.**
McCardell & Co., J. R.

**Track, Special Work.**
American Frog & Switch Co.
Cleveland Frog & Crossing Co.
Columbia M. W. & M. I. Co.
Kilby Frog & Switch Co.
New York S. & Cross Co.
Ramapo Iron Works.

**Transfers. (See Tickets.)**

**Transfer Issuing Machines.**
Ohmer Fare Register Co.

**Transfer Tables.**
American Bridge Co.
Archbold-Brady Co.

**Transformers.**
General Electric Co.
Packard Electric Co.
Westinghouse Elec. & M. Co.

**Treads, Safety Stair Car Step.**
American Mason Safety Tread Co.
Universal Safety Tread Co.

**Trolley Bases.**
Anderson M. Co., A. & J. M.
Electric Service Supplies Co.
General Electric Co.
Holden & White, Inc.
Horne Mfg. Co.
More-Jones Brass & M. Co.
Nuttall Co., R. D.
Ohio Brass Co.
Trolley Supply Co.

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Holden & White, Inc.

**Trolley Shoes.**
Holden & White, Inc.

**Trolleys and Trolley Systems.**
Ford Chain Block & Mfg. Co.

**Trucks, Car.**
American Steel Foundries.
Baldwin Locomotive Works.
Bemis Car Truck Co.
Brill Co., The J. G.
Long Co., E. G.
St. Louis Car Co.
Taylor Elec. Truck Co.

**Tubing, Steel.**
National Tube Co.

**Turbines, Steam.**
General Electric Co.
Westinghouse Elec. & M. Co.

**Turnstiles.**
Percy Mfg. Co., Inc.

**Union Couplings.**
National Tube Co.

**Valves.**
National Tube Co.
Ohio Brass Co.

**Varnishes. (See Paints, etc.)**

**Ventilators, Car.**
Brill Co., The J. G.
Globe Ventilator Co.
Holden & White, Inc.
Railway Utility Co.
St. Louis Car Co.

**Volt Meter. (See Instruments.)**

**Washers.**
Bound Brook Oil-less Bearing Co.
Diamond State Fibre Co.

# The On-Time Advertiser

who gets his copy and cuts to us well before the day his advertisement should go to press, gets better type composition, better location and a better opportunity to make necessary corrections on the proofs, which can then be submitted before publication.

# The Last-Hour Advertiser

whose copy and cuts come in at the last minute or even later, gets the best attention we can possibly give him. We work overtime to do what we can for him. But the lack of sufficient time makes it physically impossible to do as well for him as for the advertiser whose instructions come in well before the last hour.

## Get Your Copy and Cuts in Early

Do this, not on our account, but for the sake of your own advertising. We want to serve all advertisers equally well—but we can't put more hours into a day, and the advertiser who gives us the most time gets the best results.

Copy and cuts should be in our hands by Thursday of the week preceding the date of issue. This means that Thursday is the *last* day on which copy can be handled normally.

After that we cannot promise proofs, and we cannot insure classification.

For good advertising, get your cuts and copy in every week *before* Thursday.

**Electric Railway Journal**
239 West 39th Street, New York

# Tunda

During a marriage among the Tottiyans of the Tamil country a red ram without blemish is sacrificed.

It is first sprinkled with water and if it shivers this tunda is a good omen.

If it doesn't shiver, they keep picking until one with the right qualifications is secured.

This choose-and-try method is all right in picking rams or cheap carbon brushes if you're intent on making a sacrifice.

But if you don't want to sacrifice commutation and commutators permit us to suggest that you have Morganite carbon brushes *prescribed* for your service by engineers.

Rams or choose-and-try brushes have considerable BUTT to them.

There are no IFS or BUTS to the Morganite proposition.

**The Morgan Crucible Company**

**Main Office and Factory**
**519 West 38th St., New York City**

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Electrical Engineering & Mfg. Co.,
First National Bank Bldg., Pittsburgh
W. L. Rose Equipment Co.,
La Salle Bldg., St. Louis, Mo.
Herzog Electric & Engineering Co.,
150 Steuart Street, San Francisco, Cal.
W. R. Hendrey Co., Hoge Bldg., Seattle, Wash.
Charles Farnham, I. W. Hellman Bldg., Los Angeles, Cal.

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**Water Softening and Purifying Systems.**
Scaife & Sons Co., Wm. B.

**Welding Processes and Ap-**
Atlantic Welding Co.
Davis-Bournonville Co.
Electric Railway Improve. Co.
General Electric Co.
National Ry. Appliance Co.
Oxweld Acetylene Co.
Westinghouse Elec. & M. Co.

**Wheel Grinders.**
Wheel Truing Brake Shoe Co.

**Wheel Guards. (See Fenders and Wheel Guards.)**

**Wheels, Car, Cast Iron.**
American Steel & Wire Co.
Association of Mfrs. of Chilled Car Wheels.
Bemis Car Truck Co.
Griffin Wheel Co.
Long Co., E. G.

**Wheels, Car. (Steel and Steel Tired.)**
American Steel Foundries.
Bemis Car Truck Co.
Carnegie Steel Co.
Standard Steel Works Co.

**Wheels, Trolley.**
Anderson M. Co., A. & J. M.
Bayonet Trolley Harp Co.
Bound Brook Oil-less Bearing Co.
Columbia M. W. & M. I. Co.
Electric Service Supplies Co.
Eureka Co.
General Electric Co.
Hensley Trolley & Mfg. Co.
Holden & White, Inc.
Johns-Manville Co., H. W.
Long Co., E. G.
More-Jones Brass & M. Co.
Nuttall Co., R. D.
Star Brass Works.

**Whistles, Air.**
General Electric Co.
Ohio Brass Co.

**Wire Rope.**
American Steel & Wire Co.
Roebling's Sons Co., John A.

**Wires and Cables.**
Aluminum Co. of America.
American Electrical Works.
American Steel & Wire Co.
Bridgeport Brass Co.
D & W Fuse Co.
General Electric Co.
Kerite Insulated Wire & Cable Co.
Okonite Co.
Packard Electric Co.
Page Woven Wire Fence Co.
Roebling's Sons Co., John A.
Standard Underground Cable Co.
Westinghouse Elec. & M. Co.

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# The Owners of These Fine Homes Don't Want to Be Disturbed

by the dirt, dust and delay inevitable to retracking and repaving.

To be sure, rails must be renewed some time, but why not keep your streets clear, your cars moving and your public happy just as long as possible?

## THE USE OF TITANIUM-TREATED RAIL

should not be limited merely to places of exceptional traffic. It will pay in revenue and good relations to use it everywhere.

The Los Angeles Railway, the Boston Elevated Railway and the Pittsburgh Railways are some of the roads that use Titanium-Treated rail in residential districts, too.

**TITANIUM ALLOY MANUFACTURING COMPANY**

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Processes and Products Patented

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Niagara Falls, N. Y.

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Great Britain and Europe: T. ROWLANDS & CO., Sheffield, England

Railway Roller Bearings

"Installing

Using

Inspecting

Checking Up Savings

Rollway Bearings is as easy as rolling off a log," said the Master Mechanic. "We get the boxes from the Rollway Factory with all parts completely assembled. Here at the shop the journal sleeve is taken from the box by removing the end cap and is placed on the axle journal with a light drive or press fit. The box and rollers (still assembled) are then placed on the journal sleeve. The end thrust, which is completely assembled on the thrust nut, is then screwed on the journal extension and locked in position, no adjustments being required. The end cover is then put on and held in position by eight cap screws. We put three pounds of heavy oil in the box through the oil tap in the front cover. After two Rollway journal-boxes have been thus placed on the axle and truck frames are dropped into position, we make no further adjustments of the journal-box or bearings."

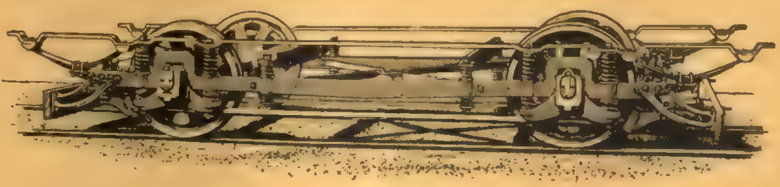
The Railway Roller Bearing Co.
Syracuse, New York

# Spreading its Wings

Extending the journal box wings to enable the large-diameter spiral springs, which they support, to come directly under the body spiral springs, provides a longer spring base to the truck frame and this enables the frame in turn to provide a longer spring base to the car body. Length of spring base, together with correct location and combination of spiral and plate springs, gives steady riding qualities and the support needed for the long body with its frequently heavily-loaded, overhanging platforms. "Wide-wing" journal boxes also preserve a better balance which insures their free movement in the yokes. Brill "Wide-wing" Journal Boxes, Brill "Half-ball" Brake Hangers, Brill Solid Forged Side Frames, are three of the distinctive features of the Brill 21-E Truck. Bulletin 220 tells of the others.

THE J. G. BRILL COMPANY, PHILADELPHIA, PA.
AMERICAN CAR COMPANY, ST. LOUIS, MO.
G. C. KUHLMAN CAR CO., CLEVELAND, OHIO.
JOHN STEPHENSON CO., ELIZABETH, N. J.
WASON MANFG. CO., SPRINGFIELD, MASS.
CIE J. G. BRILL, 49 Rue des Mathurins, PARIS.

*"Look it up in Brill Magazine"*



Cars Grow No Lighter With Age!

Many of the cars on which your older motors are in use are not only heavier than your later cars—

They are also heavier than they were when first equipped.

The addition of vestibules to open platform cars to make use of prepayment, or door and step operating mechanisms, of rails and stanchions, of air brakes, of other new safety and convenience accessories—

Has put a burden of hundreds—even thousands—of extra pounds on the same old motors.

Call for a report from your armature room today to see how many of those old overworked motors are lying there burnt out.

Then, with the figures before you, consider the economy and service satisfaction of replacing them with modern General Electric motors.

G-E 258 Ventilated Railway Motor

is a 600-volt box frame motor for light weight 24-in. wheel cars. One hour rating—25 h.p. 600 volts. A sturdy little motor built with ball bearings and full multiple ventilation for single truck two-motor equipments.

6787

General Electric Company

General Office: Schenectady, N. Y.

Sales offices in all large cities

First Automatic 1200-volt Substation

# ELECTRIC RAILWAY JOURNAL

New York, July 14, 1917 McGraw-Hill Publishing Co., Inc. Vol. 50, No. 2 10c a copy

**Barron G. Collier**
INCORPORATED

CANDLER BUILDING
220 West 42nd Street, New York City

Street Car Advertising
Almost Everywhere

# Westinghouse

## Railway Motors and HL Control

### Lake Chautauqua

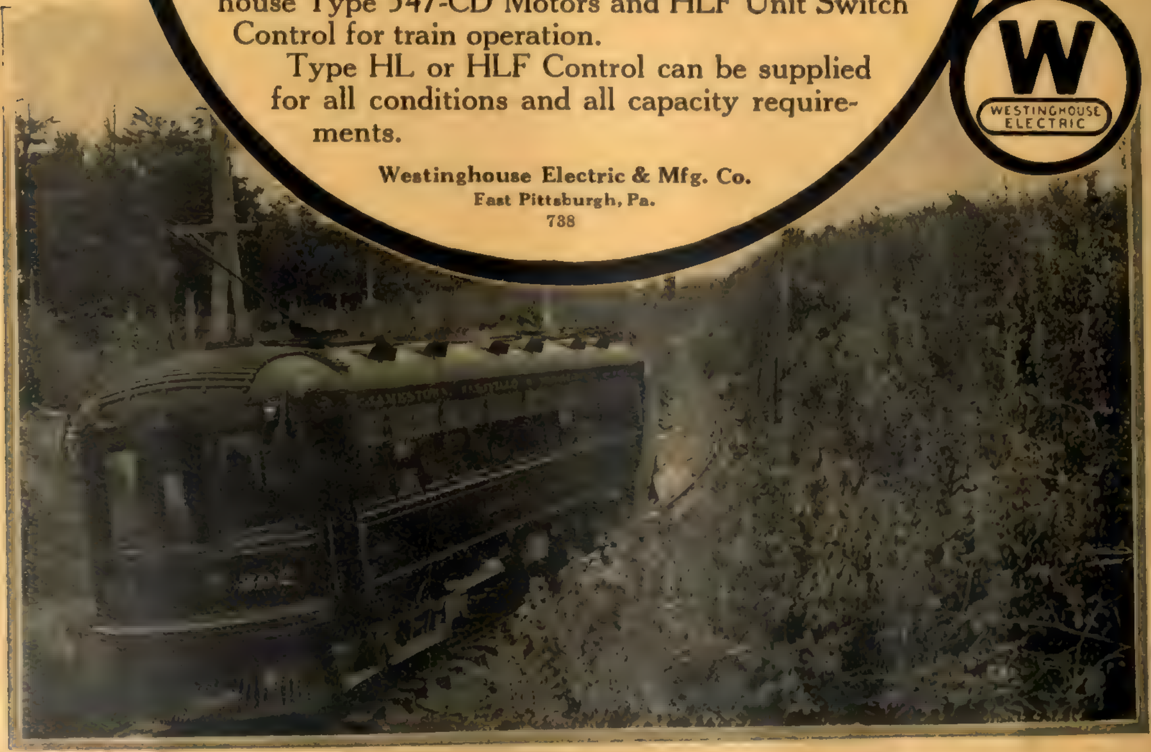
One of the Empire State's most beautiful localities is served by the Jamestown, Westfield and Northwestern R.R., widely known as the American Scenic Route.

Modern interurban cars are used to handle the dense population, and the immense crowds of pleasure seekers.

The cars are equipped with Quadruple Westinghouse Type 547-CD Motors and HLF Unit Switch Control for train operation.

Type HL or HLF Control can be supplied for all conditions and all capacity requirements.

**Westinghouse Electric & Mfg. Co.**
East Pittsburgh, Pa.
738



# ELECTRIC RAILWAY JOURNAL

H. W. BLAKE, Editor

VOLUME 50, No. 2 NEW YORK, JULY 14, 1917 PAGES 45 TO 88

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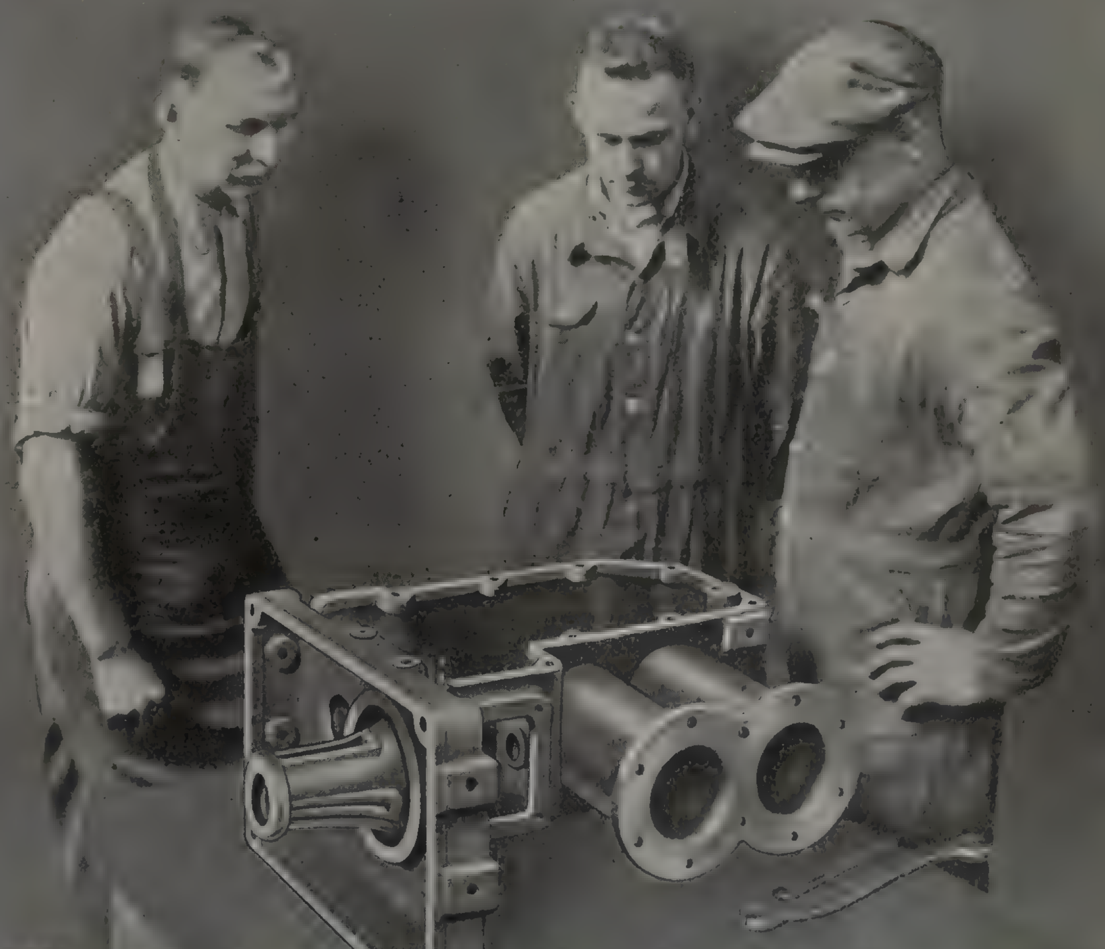

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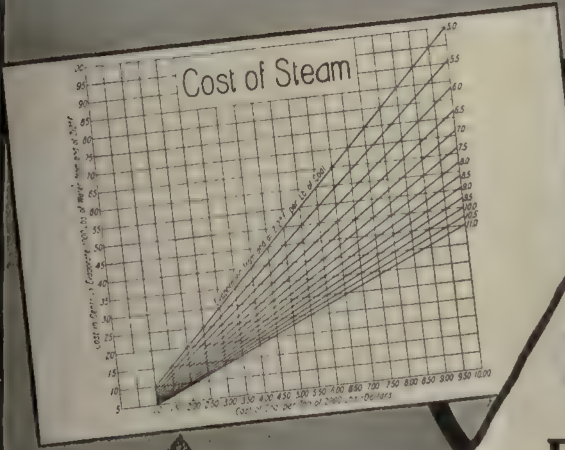
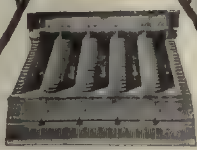
# Westinghouse

# Underfeed Stokers





Knowing the price and the amount of coal burned, and the quantity of water evaporated, the above table will tell you what it should cost you in cents per lb., to generate steam. This is a very useful table. We will gladly mail you a copy upon receipt of your name and business address.

No waste—No idle equipment—No Banked Fires— No Boilers to be held in readiness for the daily peaks. FOR, the Westinghouse Underfeed Stoker embodies in its design a wonderful flexibility— a tremendous overload capacity.

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Even if you have but one or two small boilers, there is no reason why your economies and your reserve capacity should not be relatively equal to those of the big central station.

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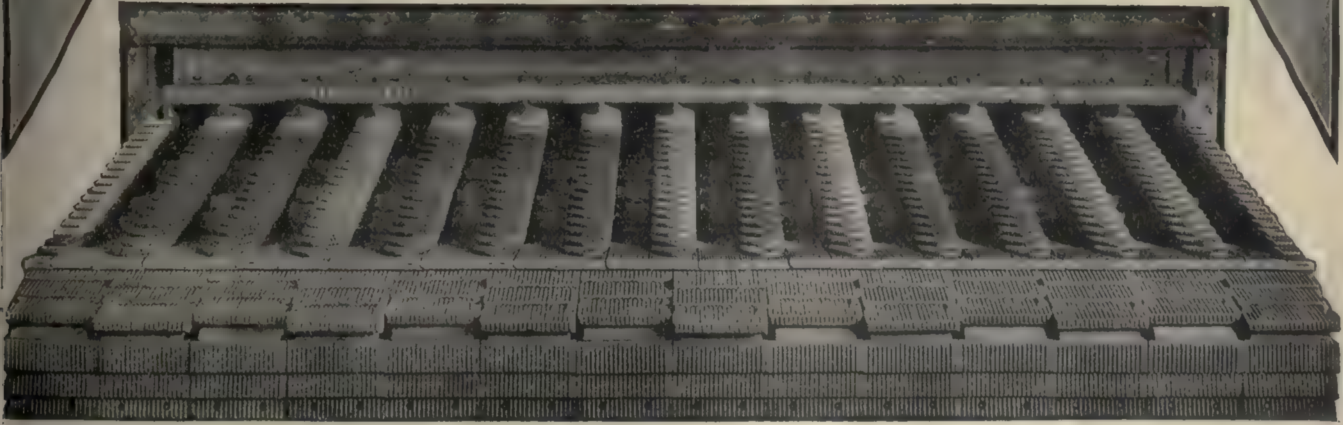

Clark and Adams Street, Chicago, Ill.

# At Busy Corners Like This—

Phono-Electric Wire is used to insure against such a breakdown as occurred lately in another city, where nineteen men worked for five hours to replace one mile of No. 00 hard-drawn copper trolley wire carried from ears spaced 40 feet.

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# Phono-Electric

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is made to prevent just this sort of expense and annoyance. Its qualities make it the line of dependability, permanence, and ultimate economy.

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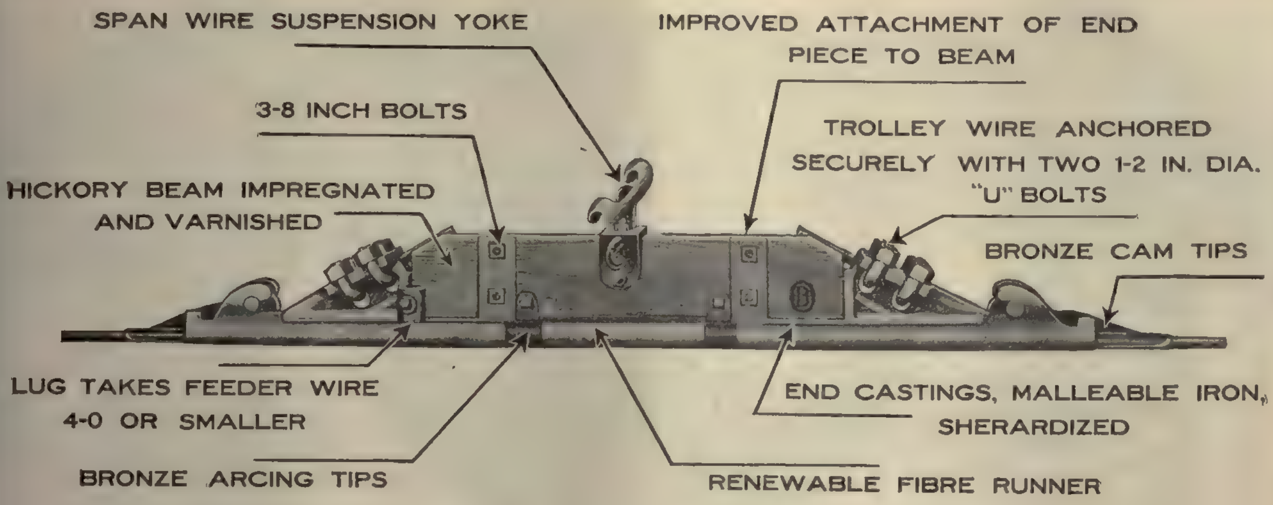
**Bridgeport Connecticut**


SPAN WIRE SUSPENSION YOKE
IMPROVED ATTACHMENT OF END PIECE TO BEAM
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TROLLEY WIRE ANCHORED SECURELY WITH TWO 1-2 IN. DIA. "U" BOLTS
HICKORY BEAM IMPREGNATED AND VARNISHED
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LUG TAKES FEEDER WIRE 4-0 OR SMALLER
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BRONZE ARCING TIPS
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It is easy to install. Two heavy U-bolts are tightened on the wire at each end, O-B Cam Tips slipped under the hooks, turned over and down on the wire and the lips clinched.

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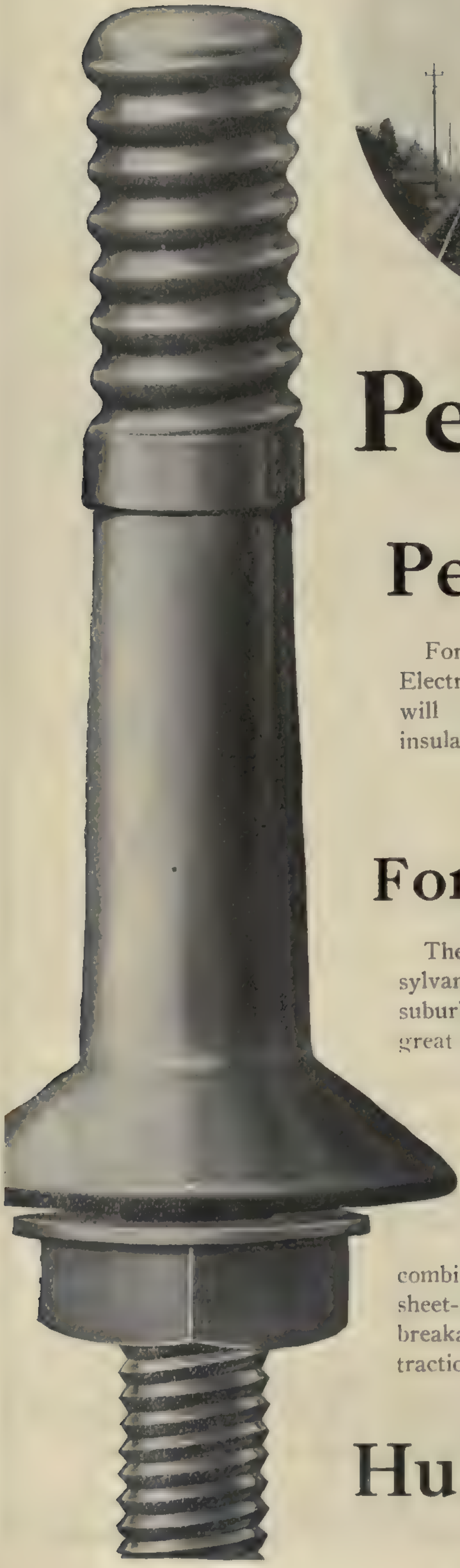
The beam is of sturdy hickory, impregnated and varnished.

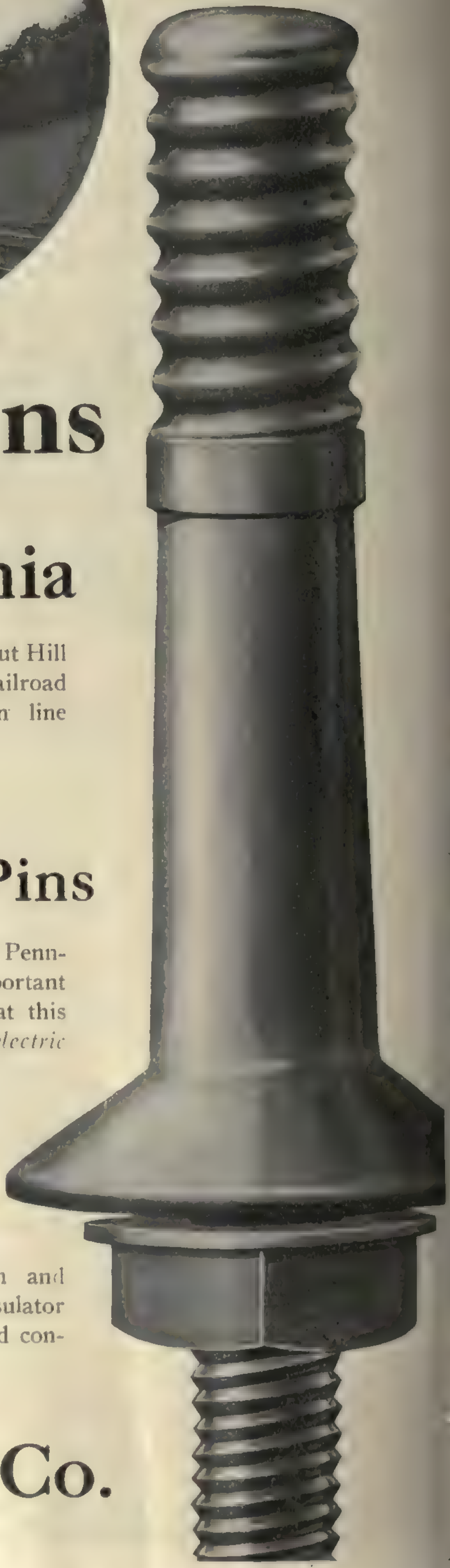
The O-B Type C will not buckle, and when properly installed the wire will break before it slips.

*It is listed and described on page 196 of Catalog No. 16, but has been improved since the issuance of that book.*

**The Ohio Brass Co.**

**Mansfield, Ohio**





# Peirce Pins
## on the
## Pennsylvania

For its new Germantown-Chestnut Hill Electrification the Pennsylvania Railroad will use 44,000-volt transmission line insulators fitted with

## PEIRCE
## Forged Steel Pins

The choice of Peirce Pins by the Pennsylvania Railroad for this important suburban electrification proves that this great railroad sets up for its *electric* service the high standards which have long characterized its *steam* service.

Peirce forged pins are the best insulator insurance you can buy. Their combination of forged steel pin and sheet-steel thimble eliminates insulator breakage due to the expansion and contraction of cast-iron pins.

**Hubbard & Co.**
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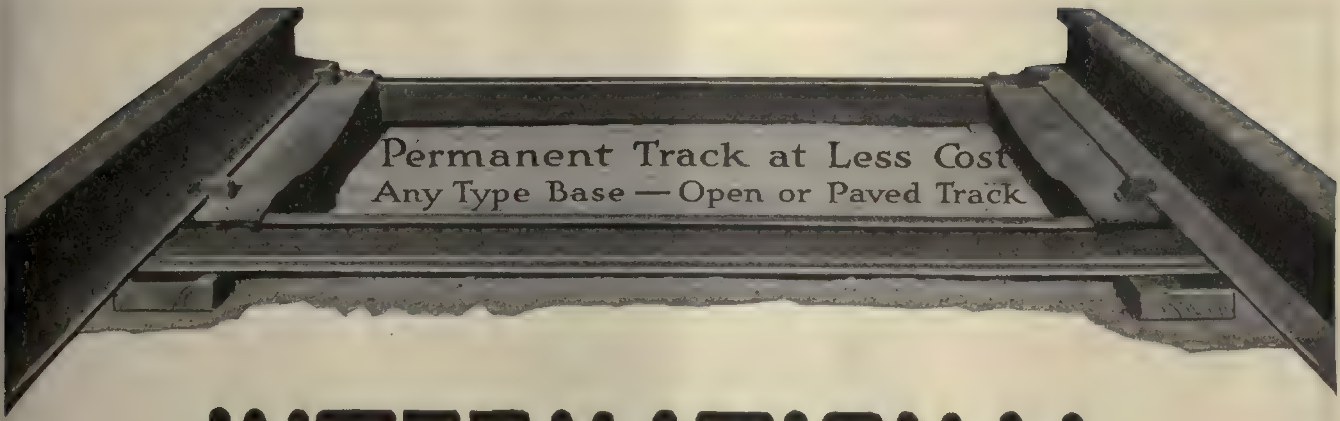
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## STEEL TWIN TIES

## 33% to 45% Saved in Construction Materials

First in blocking to grade and line. Three wood ties require six blocks. An International Steel Twin Tie requires only four blocks—a saving of 33 1/3% in blocking!

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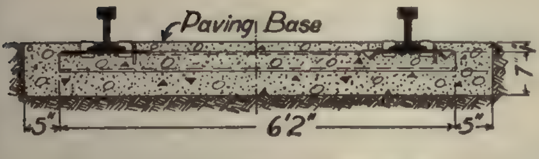
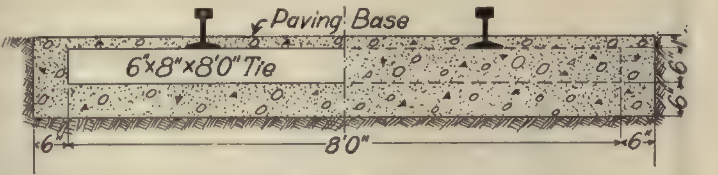


International Steel Tie Construction



Standard Wood Tie Construction

The wood tie construction requires 1495 cubic yards of concrete per mile of track. International Tie construction, because of the shallow foundation, requires only 790 cubic yards of concrete per mile of track. There's a 48% saving in concrete for foundation or ballast, with 7 inches instead of only 6 inches of effective bearing material beneath the tie.

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If you don't believe it ask the man who has used International Steel Twin Ties.

Let us submit comparative estimates for your job.

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**Manufacturers of Steel Twin Ties and Crossing Foundations**

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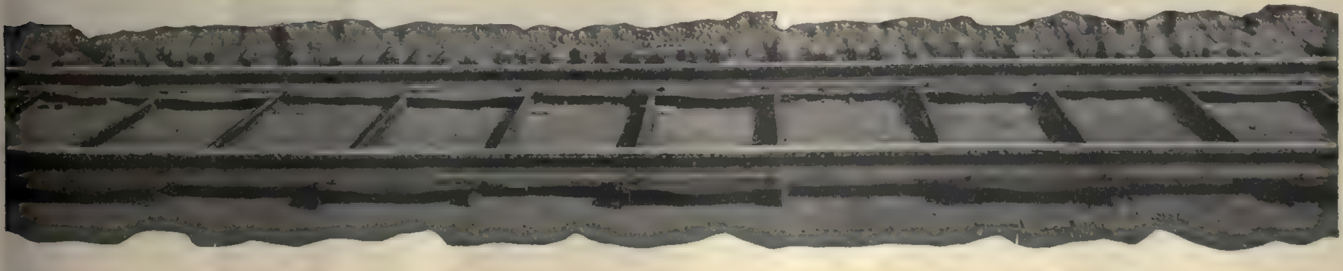

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that it is now in position to offer electric railways the opportunity of installing

### Gailor Rail Joints

and several other types commonly used. The high rate of welding and the simplicity of the equipment operated by the

### Railway Company Employees

makes it possible to install such joints, if necessary,

### Under Traffic

High efficiency is the keynote of the equipment and means welding economy heretofore unknown to railways. The

### Portable Universal Arc Welding Motor-Generator

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### Any Method of Arc Welding

such as carbon arc or metallic electrodes, including besides Rail Joints, Cupped Rails, Special Work, General Shop Welding and Copper Bonds.

***If you are interested in this method of economical and universal welding, write for particulars as to prices and license rights.***

ATLANTIC WELDING
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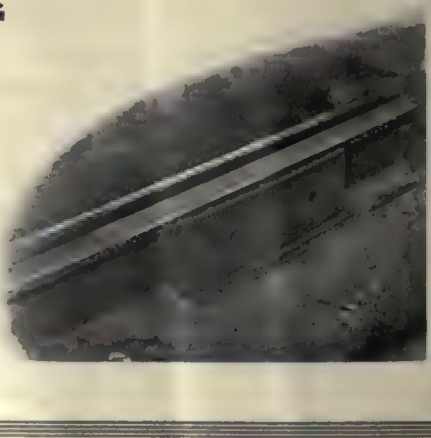


Showing car of the Southern Penna. Traction Co., at Chester, Pa.

## *On the Lines of the Southern Penna. Traction Company*

## Armies of munition workers are handled with the aid of these time-tried specialties in the busy cities of Chester and Wilmington

In these busy "munition" cities the cars are equipped with Keystone Trolley Catchers, Illuminated Car Signs, "Golden Glow" Headlights, "Safety" Car Lighting Fixtures and International Registers. During the rush hours the traffic of great armies of industrial workers is handled much more efficiently and much more safely with the assistance of these recognized specialties.

Keystone Trolley Catchers

These rugged and foolproof trolley catchers keep the trolley poles from damaging the overhead. They save many poles being bent and many consequent delays in service.

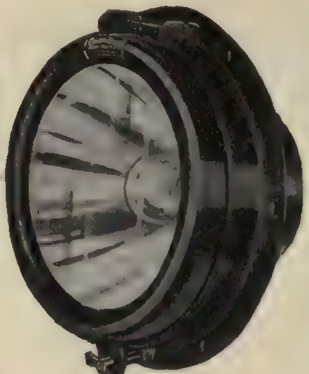
Keystone Trolley Catchers on your cars will assist greatly in giving good service.

Illuminated Car Signs

Illuminated Car Destination Signs portray "an invitation" to the public to ride. Particularly on the park cars they are an excellent advertising medium.

Besides, they carry many different destination names, so making easy rerouting of cars.

***Ask for a set of catalogs covering this material***



"Golden Glow" Headlights

"Golden Glow" Headlights add to the safety of car operation by lighting up a path in full detail, way ahead of the cars.

Their famous "Golden Glow" reflectors have proved their superiority in many ways on hundreds of railways.

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*Manufacturer of Railway Material and Electrical Supplies*

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We shall be glad to confer with you as to which outfit is the best for your purpose.

## The Electric Railway Improvement Co.
Cleveland

## *The Wisdom of Experience*

THE following extracts are quoted from an address by Mr. B. R. Brown, Superintendent Maintenance of Way, Dallas Railways Co., presented at the Convention of the Southwestern Electrical and Gas Association, April, 1917.

"The Maintenance of Way Department of the street and interurban railways of today stands out in sharp contrast to the Maintenance of Way Departments of ten to fifteen years ago. The evolution has been both rapid and colossal."

"In those early days it was common practice, once a track was laid, to do just as little repair work as possible until the track was more than worn out, and then to replace it all new. But with the modern electric railways, in prosperous and fast growing American cities, the problems of this department have made necessary the adoption of up-to-date tools and equipment for the efficient handling of construction and repair work."

"These conditions have brought into use many efficient and economical types of equipment for use in the maintenance and construction of track, most of which are now in general use, and have proven their merits."

"For the removing of cupped joints, a very efficient machine has been developed in the **Reciprocating Track Grinder.**

"The machine is used more perhaps for removing corrugations from the rails but for either use it is especially adapted. The Dallas Consolidated Electric Street Railway Company purchased one of these machines one year ago and it has been in constant use ever since."

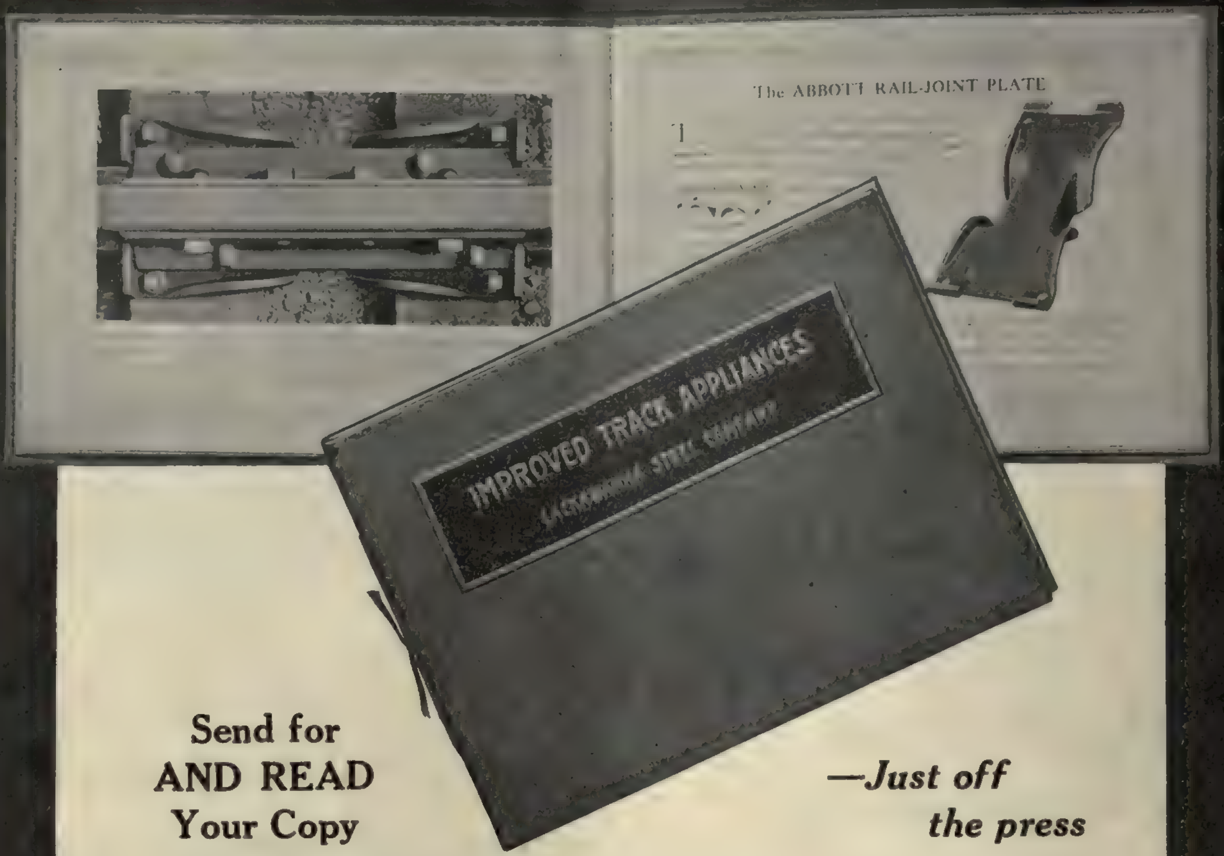
"Certainly the use of some such machine will prolong the life of the track, and is necessarily a part of the equipment of every maintenance of way department."

Is not Mr. Brown's experience as thus recorded valuable to you?

**Reciprocating Track Grinder**

**Railway Track-work Co.**

**30th and Walnut Streets, Philadelphia**



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This book describes and copiously illustrates three appliances that every man responsible for the condition and upkeep of steam or electric railway or industrial track should know more about:

**The Abbott Rail-Joint Plate**

for the preservation of properly aligned track surface at rail joints, for protection of the rail ends against battering, for greater safety and for reducing maintenance expense.

**The Lackawanna Safety-Head Angle Bar**

for eliminating the wear and cutting that with ordinary angle bars are a frequent cause of fracture.

**The Lackawanna Hook-Shoulder Tie Plate**

for holding rails with great security, saving in repair expense and reducing maintenance labor.

The appliances offer possibilities that are too important to neglect. The usefulness of each under various operating conditions is explained in detail in this booklet, of which every page should be carefully read. A copy will be mailed on request.

314

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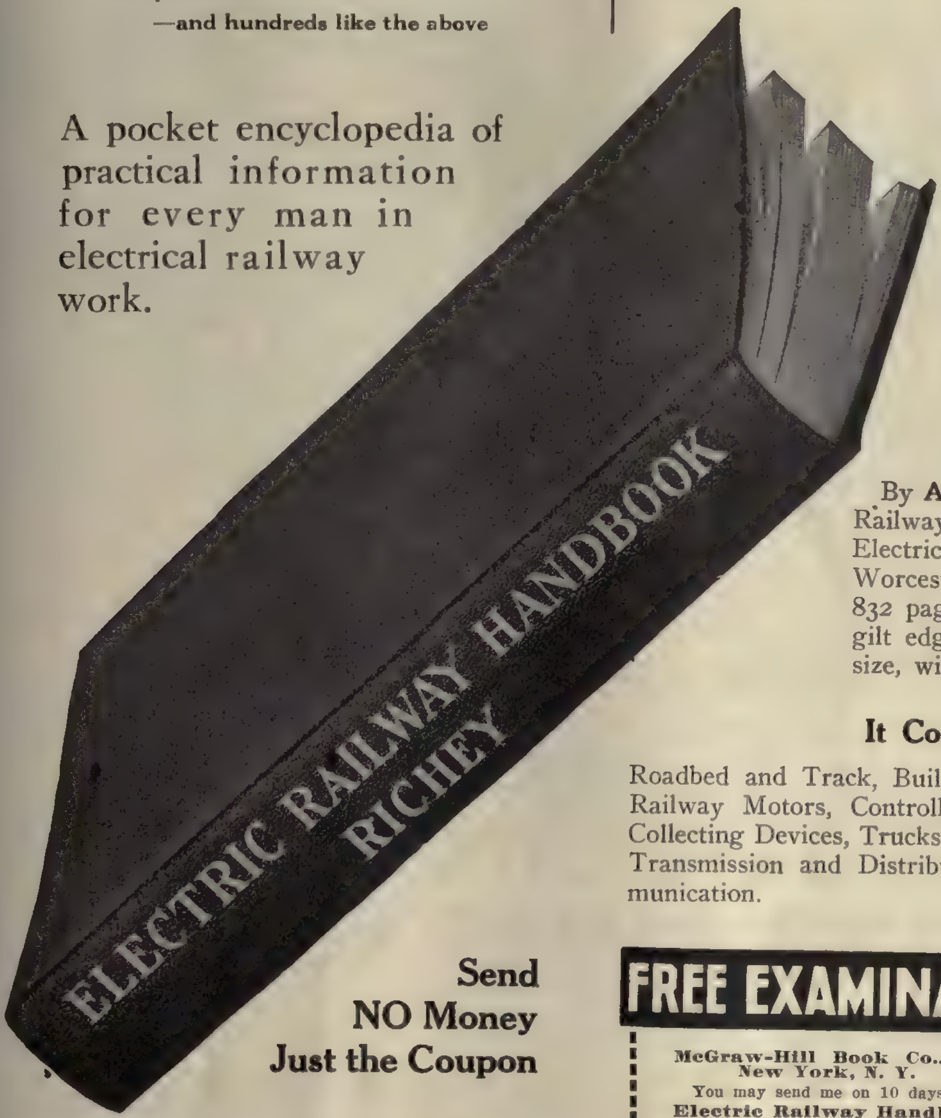

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ARE IDEAL FOR
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With these registers, the large percentages of people who have the exact change for fare or fee can pass on immediately, thus eliminating paper and ENCOURAGING PATRONS TO SAVE THEIR OWN TIME AS WELL AS YOURS.

As a railway man you don't have to be told what this means when you have to handle a crowd that wants to be at the ball grounds before the first pitch.

Among other installations,

**International Motor-driven Station Registers**

made possible the quick handling of 400,000 rabid baseball fans at the last World's Series; of many thousands of visitors at the Springfield (Mass.) Agricultural Fair in 1916; and now two

**El Motor-driven Station Registers have just been ordered for Diversey Beach, Lincoln Park, Chicago**

By using these Internationals, the Park Commissioners will be sure that none of the dimes for bathing suits or lockers will go astray, aside from the satisfaction of serving the sweltering Chicagoans faster than in the past.

How many uses have you for International Motor-Driven Station Registers?

**The International Register Company**
**15 South Throop Street, Chicago, Ill.**

# The Motorman Sees It Work

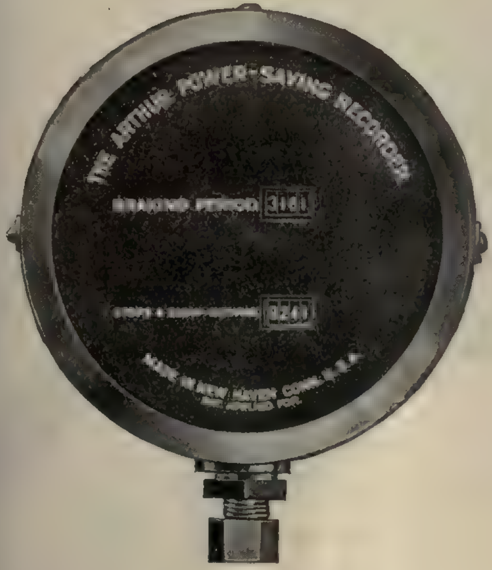
Showing recorder location on one of the cars of the Connecticut Company.

## He Knows It Is Right
## He Understands It

To be permanently effective any device intended to check the relative efficiency of motormen must take into consideration the psychological effect of such a device on the men.

With the

# Arthur Power-Saving Recorder



the men can see the record being made right before their eyes. There is nothing mysterious or hidden about it.

It records "braking time" and number of "stops and slowdowns." Motormen understand at once that more coasting means less braking, for a man can't coast with his brakes on. Its operation, therefore, is perfectly clear to the simplest mind.

When the run is finished the motorman takes his own record from the dials—writes down the figures *himself*.

There are two advantages in this. First, the man in taking down his own figures knows that he is not being fooled in any way.

Second, the fact that he *personally* has something to do in connection with the record keeps his interest *and* enthusiasm in the subject constantly alive.

Automatic methods of doing things tend to turn men into automatons. The Arthur Recorder keeps men *thinking* and alive to what they are doing.

That's a very important point.

**The Arthur Power-Saving Recorder Co.**
**New Haven, Conn.**

***"Power wasted at the brake shoes is the true measure of the motormen's relative efficiency."***

# The Miller Nutles

Now at
Your
Service

In spite of the rapid, widespread and successful adoption of the Miller Trolley Shoe, we were not satisfied with mere superiority to the trolley wheel, but kept on perfecting the principle of sliding contact until we had produced a Miller Shoe without a nut or a bolt.

oltless Trolley Shoe

No Nuts — No Bolts

This means—first, total elimination of any possible trouble due to the shaking off of threaded parts.

**The number of parts** in this shoe has been reduced one-half as compared with the old type.

**Worn contacts are renewed** by shearing off the heads of two rivets and replacing.

A graphite filled bushing is used on centre pin.

By removing cotter and centre pins every part of shoe is exposed.

**Contact, Centre Pin, Bushing, Spring are the only wearable parts.**

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**South Boston, Mass.**

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# Pulling the Load

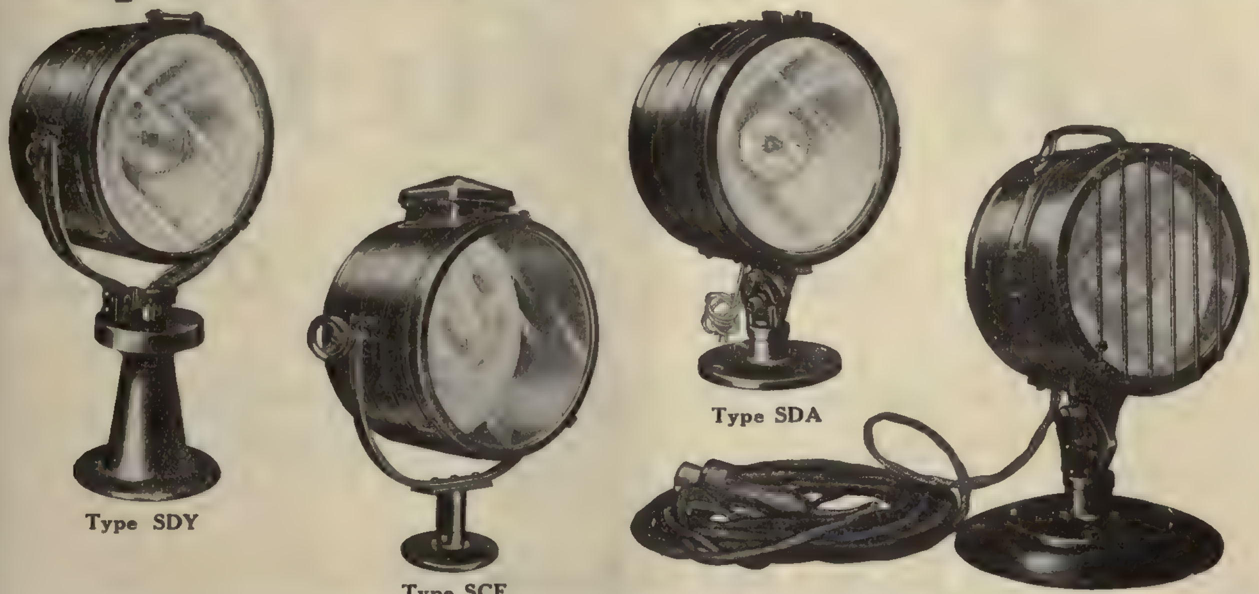
Down hill and on the level, a load moves easily; but up a grade it is a hard pull. You wouldn't try to move a load up hill with the brakes set. But that is the practice in many powerhouses. Any ordinary oil answers the purpose fairly well when the engines are running light, but when the load comes on and the pull is up hill, then every bearing should turn with the minimum of friction—you need the best oil you can buy.

Specially compounded of the finest materials to meet the severest service, Galena Oils are unequalled for powerhouse lubrication. They are so exceptionally good that we stand back of them with a guarantee of service and cost.

**Galena-Signal Oil Co.**

**Franklin, Pa.**

# Imperial Flood Light Projectors



Type SDY

Type SCE
(1000 watts)

Type SDA

Type SDR

# Protecting Bridges

Guarding Tracks, Freight Yards, Round Houses.—On 24 hours-a-day rush jobs.—Speeding up night construction work to daytime output.—

**Wherever Night has to be turned into Day**
**Imperial Flood Light Projectors are found**

They solve both the working-at-night and the protecting-at-night problems.

Their strong, steady beam is directed, spread or contracted by the simplest movements. They are made in many distinct types and take flood-lighting Mazda lamps up to 1000 watts, 105-130 volts.

Imperial projectors are of rugged build. Their casing of rust-proof material makes them thoroughly weatherproof and insures years of service. Adequate ventilation is also provided for.

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## CROUSE-HINDS COMPANY

SYRACUSE, N. Y., U. S. A.

NEW YORK BOSTON CHICAGO

# How to Giv

## *at Les*

That's always been the problem of every electric railway, but never was that problem more pressing than now—

When the private automobile, the irresponsible jitney, the cost of materials, the scarcity of labor and the ever-growing burden of taxation have made

## *A Continuation of* Present Operating Methods *Impossible*

True to its tradition of *leading* instead of *trailing*, the Electric Railway Journal has been conducting an extended study of electric railway conditions throughout the United States. It has searched far and near for the data that would be most helpful to the electric railway industry *today*.

**ELECTRIC RAILWAY JOURN**

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That most helpful data will be found in the "More Service for Less Cost" issue of the

## Electric Railway Journal

*Dated September 22*

Of course, Mr. Manufacturer, you will want to tie up with this story of successful achievements by means of the biggest and best advertisement you ever carried. Then

***Come across with a Show-Me Inquiry on what this issue means to you.***

**9 WEST 39th STREET, N. Y. CITY**

culations

## What "Van Dorn" Gear Specialization Means to You

(1) Smooth- and silent-running gears which mesh perfectly, thereby reducing the friction to a minimum. This is due to our skill and the care exercised in cutting the gears.

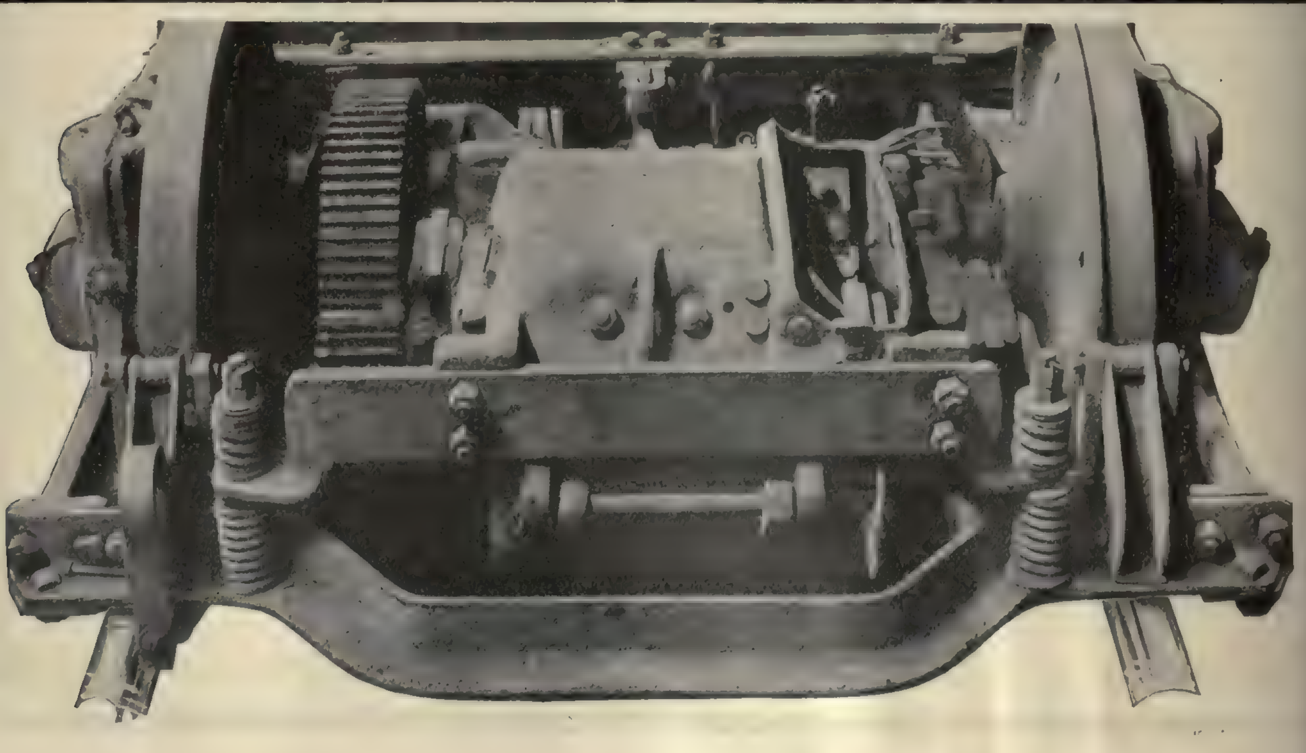
(2) Gears which will give maximum service and withstand the strain of the heaviest loads and steepest grades without losing their teeth. This is the result of long experience in heat treating and hardening processes.

(3) Perfect gears at all times. Our rigid tests and inspection prevent defective gears from leaving our plant. In addition to the standard tests every "Van Dorn" gear and pinion is subjected to the famous Brinell test for hardness. These features together with the quick deliveries afforded by our large modern plant and favorable location make "Van Dorn" gears the best buy.

***Send your specifications and blue prints to Dept. E. R. J. for estimates***

**THE VAN DORN & DUTTON COMPANY** **Gear Specialists**
CLEVELAND, OHIO

Sales Offices: Atlanta, Boston, Chicago, Cincinnati, Denver, Kansas City, Milwaukee, New York, St. Louis, San Francisco, Toronto.



# The Motorman Knows That The Rico Coasting Recorder

## Shows His Increased Coasting Time if He Reduces Power-on Time

Every motorman knows that "Power-on Time" is one of the four components of his schedule, the other components being

Brakes-on Time
Standing Time
Coasting Time

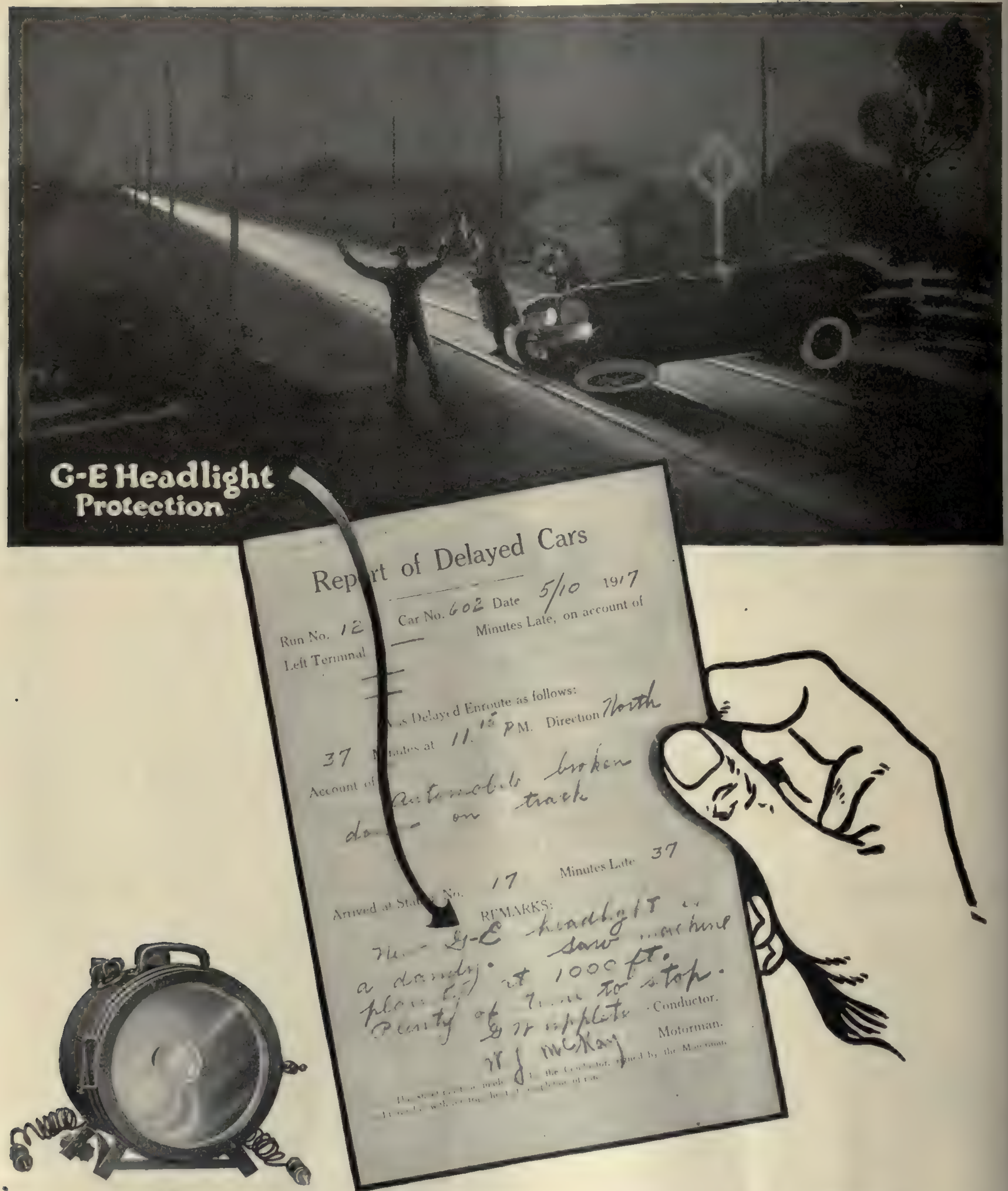
This "Power-on Time" is reduced by using the highest practicable rate of acceleration and by throwing off power at the earliest practicable moment consistent with schedule maintenance, so that the aggregate time available for coasting will be increased—a method

WITHIN THE COMPREHENSION OF THE MOTORMAN

But practiced by him **permanently** only with the Rico Coasting Recorder because it shows the motorman, in print, the efficient relation between all the components of schedule time and because the true gage of his car-operating efficiency is the proportion of coasting time to schedule time.

**Time is the Essence of Railroading**

RAILWAY IMPROVEMENT CO. RICO 61 BROADWAY, NEW YORK



Report of Delayed Cars

Run No. 12 Car No. 602 Date 5/10 1917

Left Terminal — Minutes Late, on account of

Was Delayed Enroute as follows:

37 Minutes at 11.15 P.M. Direction North

Account of automobile broken down on track

Arrived at Station No. 17 Minutes Late 37

REMARKS:

The G-E headlight is a dandy. saw machine plainly at 1000 ft. Plenty of time to stop.

G W Appleton Conductor.

W J McKay Motorman.

J-37
Portable Incandescent
Headlight

6869

General Electric Company

General Office: Schenectady, N. Y. Sales offices in all large cities

# Electric Railway Journal

Published by the McGraw-Hill Publishing Company, Inc.
Consolidation of STREET RAILWAY JOURNAL and ELECTRIC RAILWAY REVIEW

Volume 50 NEW YORK, SATURDAY, JULY 14, 1917 Number 2

## A Conference Will Replace the Convention

THE decision of the executive committee of the American Electric Railway Association, announced last week, to have the fall conference take the form of an open meeting of the executive committee is undoubtedly the best solution of the existing situation. To those who can leave their work for a day of two it gives an opportunity to discuss national issues. At the same time, it permits the association to dispense with the election of officers and other business which would have to be transacted if an annual meeting were held. Obviously, it would hardly be suitable for important matters to be determined by those who could gather at a conference to last a day, or two at most. In view of these facts, we have decided that it would be appropriate for us to modify the form in which our usual "Convention Number" is published. Instead of a special number, we shall publish an enlarged regular issue somewhat similar in appearance to our maintenance issue. It will be dated Sept. 22. The special subject to be discussed in this number is how electric railway companies can best improve their service at a reduced cost. It will be a "More Service, Less Cost" issue, and we promise that for the interest of its contents it will equal or exceed any Convention Issue which we have published in previous years.

## Street Congestion Not an Ineradicable Evil

MANY persons have got into the habit of looking upon street congestion as a necessary evil of city life, but this should not be so. The fact that the large number of automobiles now in use has greatly increased this congestion during the last few years makes its prompt relief by vigorous action more important than ever before. We present this week the results of an extended study on this subject by F. W. Johnson, who describes several very practicable methods of ameliorating the conditions brought about by congestion in our city streets. In addition to these means of relief, two other reforms must be adopted. The first of these is that every occupant of the highway, the electric railways included, must so order their travel over it and stops on it as not unduly to interfere with its use by others. Much more in this direction can be done, provided strict traffic rules are passed and enforced, than most municipal officials realize. The largest cities in the country have been obliged to obtain relief in this way in their crowded avenues, but in the smaller cities much remains to be done. The second part of the program for making the streets of the greatest use to the greatest number is to recognize the superior right on the highway of the electric car. The decision of the Pennsylvania Supreme Court on this point, quoted by Mr. Johnson, is founded on the broad principle of the convenience and accommodation of the public as a whole. Of this principle there should be greater recognition in other states.

## Employment of Women Involves No Concession

"EVEN if the staggering Russian republic can work a miracle and really get back into the war, every ounce of your country's strength will be necessary —supremely necessary—and after all is said and done, it is woman's work that will save you; just as it is saving us. The women here have been and are absolutely marvelous. Get your women interested, then instructed and generally introduced. Labor simply must co-operate, and labor must make concessions." We quote this excerpt from the letter of a correspondent in England, not only for the generous recognition of the English women's part in the war, but also because of the emphasis laid upon the implied opposition of labor to women workers which appears in the last sentence. In the United States this part of the problem of women's employment appears almost negligible. Two or three years ago, perhaps, labor might have granted a concession in admitting women to its ranks, because men might thus have been left unemployed. To-day, however, conditions are wholly changed, and jobs for every one are going begging. For labor to accept ungrudgingly the employment of women at tasks within the range of their physical ability is, therefore, by no means a concession; it is a patriotic duty, and we believe that American labor recognizes the fact. Especially is this true upon electric railways, where women conductors have been demonstrated, through British experience, to be equally as efficient as are men. For each woman conductor who fills a vacancy there is, in consequence, the saving of one man for work that can be performed only by men. To fill a vacant conductor's position with a man means in effect that some industry has been unnecessarily deprived of a man's services, and when that industry is such that it can be operated only by men the injury to the nation is just as definite as if the man had lost his life on the battlefield. Indeed, if there is any concession at all in connection with the employment of women conductors, it is not to be made by labor. Instead, it will be made by government if any men whatsoever are allowed virtually to intern themselves on the rear platforms of electric railway cars.

## A Word of Cheer to Electric Railway Men

THERE is no occasion for serious worry among electric railway men because the voice of unreason makes itself heard through the newspapers. It would, indeed, be a miracle if no strong opposition arose to an increase of fares from 5 to 6 cents. No matter how unanswerable your argument may be, there will be opposition both reasoning and unreasoning. To the reasoning and reasonable opposition you will make your argument with confidence.

The people as a whole are fair and stand for the square deal. To hold otherwise is to lack faith in the people, it is to argue against democracy itself. Democracy looks to the people for its last judgments. And this nation is unalterably committed by its position in this war to fundamental faith in the people. But while the voice of unreason will be heard, it will not control. The demagog of the press shall no more prevail in the long run than the demagog of the platform.

Thus far the applications made by the electric railways for an increase of fare have been received by the press in a spirit that is wholly satisfactory. Editorials have been generally to the effect that if the companies can prove their case, a readjustment of fares by the Public Service Commission must follow as a matter of justice and of duty, not only in the preservation of the companies from loss or even bankruptcy, but the preservation to the public of good service.

On the other hand there is the unreasoning critic, the kind well known everywhere, who opposes as an "outrage" anything that a public utility company proposes. Let us quote from an editorial of this type from one of the up-State New York papers:

> The people of New York State are being skillfully doctored to meet with least resistance a proposal of public service corporations to raise their car fare to 6 cents. It is evident that the corporations are together on this plan and they are cleverly sounding out sentiment here and there and preparing, by unity of action, to inflict this outrage upon the public. . . .
>
> If the people of New York State submit to the introduction of the 6-cent fare as a general proposition they will submit to an infamous validation of crooked securities.
>
> They will acquiesce in the doctrine that even if a road has been looted it shall be allowed to bleed the public in order that the plunder may be taxed out of straphangers.
>
> They will virtually O.K. the plunder of the public through leased lines and disadvantageous contracts that benefit insiders.
>
> (And so on in extra large type two columns wide, nearly a page deep.)

And this, mind you, before the companies had presented their case or the Public Service Commission had heard a line of testimony.

It is well worth while to reprint this as a type. But in our judgment anxiety over the ultimate effort of this sort of unreasoning, inflammatory diatribe is useless worry and time wasted. Abraham Lincoln's observation that "you cannot fool all of the people all of the time" is the basic truth that should hearten the railway man whose local paper subjects him to such an attack.

A newer conception of the function of public officials is obtaining. The function of a district attorney, for instance, is not wholly to make a record of convictions but to assist the courts in doing justice and to guard the legal rights of all prisoners. The function of the public service commissioners is not limited to "protecting the people"; it is to preserve the fair relationship of both the public and the utility companies. To damage either is to harm both.

So with the press. It, too, has a public function, by reason of which it has a special status under the law. And it cannot be true to that function by assuming that the public utility company is always guilty. The outstanding phenomenon indeed in the recent history of the press is the growth in influence, power and prosperity of the responsible press. The day of the reptile press is a day that is gone. Let no one be dismayed by any other idea. "Truth is mighty and it shall prevail."

## When Does It Pay to Develop Water Power?

THE request of Secretary Franklin K. Lane that in the production of electrical energy water power be utilized as far as possible gives especial timeliness to the paper by H. St. Clair Putnam, delivered at the recent New York meeting of the A. I. E. E. While the appeal of his main argument was to the consulting engineer, he enunciated certain principles which should be understood by the railway manager or engineer who has developed or undeveloped water power available.

The problems which Mr. Putnam set for solution were these: To determine when the development of a water power will secure better results than the construction of a steam plant, and when it is better to develop the water power than to extend an existing steam plant. Without going into detail of the reasoning, his conclusions may be summarized as follows: Where a market for the power is available or can be created practically all water power should be developed beyond the minimum power available, and hence the plants require steam plants in connection with them. The development should be carried to the point where the best results can be obtained in combination with such steam plants. It is economical to develop water power farther as the operating costs of the steam plant are increased, and, in general, as the value of money decreases. The general tendency of the items entering into the operating cost of a steam plant is upward whereas that of the value of money is downward. The increase in the efficiency in steam turbines and the construction of steam plants at coal mines both operate to make it difficult to develop water power profitably, especially those with low head where the first cost is relatively high. The development of all possible water power should be encouraged both for the conservation of fuel supply and the economical advantage resulting from the use of power in industries. Hence the public should do everything to encourage power companies in this direction. Any policy under which additional burdens are imposed upon water power development is against the true interests of the public.

This summary brings the water-power situation right up to date. As we pointed out some weeks ago, there is a possible patriotic duty in the situation, also, which may dictate the use of water power even beyond the boundary of exact economics. This boundary should always be discerned clearly, however, even if it is deliberately overstepped in emergency. There is a fascination about water power which has caused many powers to be developed unprofitably. No one likes to see good power going to waste but, unfortunately, most water power is fluctuating in character and at the same time the unit investment cost involved is high compared with that in the steam plant. Again, the load factor of many loads is low, so that available power cannot be utilized effectively. In general a steam auxiliary is necessary as a source of reserve power as well as economy, and the hope for the future of water power lies in so operating it in connection with steam power as to produce an over-all maximum economic efficiency.

## Automatic Substations as Labor and Money Savers

An annual saving in labor and energy cost of nearly $1,600 in a single substation by the use of automatic control is sufficient to attract attention at any time, and particularly now when it is so difficult to make ends meet. This is the estimate of the result on an interurban line of the Milwaukee Electric Railway & Light Company. Better yet, the saving is largely produced by the liberation of two men for work on other service which cannot be done by mechanical devices. How the saving is being made is explained in detail in an article elsewhere in this issue. It is one of several which we have published by means of which the brief but promising history of the automatic substation can be traced.

The span of three years covers this history as far as the electric railway is concerned, and the progress made in this short time is surely creditable. Year before last we expressed our conviction, based upon observation of electrical apparatus and experience with it, that the technical difficulties in the way of making the automatic control operate properly could be overcome. The limitations in the way of its application were stated to be economic rather than technical. The opinions of the railways which have had occasion to consider and in some cases adopt the plan seems to have confirmed the accuracy of this view. In the substation described in this week's article, the complication of the equipment is greater than in previous automatics due to the use of two 600-volt rotaries in series to produce 1200 volts, but no insuperable difficulties were encountered, and as a practical matter the trick was turned simply enough. The electrical engineers will be pleased in following through the mazes of the circuit diagram which tells the story (to the initiated). The others will be interested in the method as a transportation matter, particularly with relation to a possible increase in the shrinking surplus.

## How the Association Should Help the Industry

A BULL'S-EYE shot! The letter in last week's issue from Leake Carraway, director of publicity Southern Public Utilities Company, Charlotte, N. C., certainly hit the mark when it showed the desirability of a publicity bureau for the American Electric Railway Association.

The present electric railway situation is not local; it is national. But the association, as a national organization, has not done all within its power to aid the railways. It has a duty to perform along the line of encouraging electric railway publicity and better public relations. There are many progressive companies whose publicity ideas are well developed and their public relations activities honest and sane. But there are other railways—too many, in fact—whose inertia in this regard needs to be overcome by the furnishing of not only inspiration but also concrete material from association headquarters.

At the last convention the committee on public relations proposed that a bureau on public relations be formed by the association, to have charge of the preparation and the distribution of absolutely authentic and attractively prepared information on public relations matters. The psychological time for that bureau is now. If it were in existence, how much it would mean to the industry!

As H. G. Bradlee stated in our issue of June 30, to meet successfully the present situation under war conditions and furnish satisfactory service to the public will require the combined ingenuity of all utilities. The employment of women, one-man car development, the raising of the load factor, the increasing of fares—these and other topics must be considered. The practicability of all such ideas ought to be thoroughly investigated by the association, and concrete data compiled for publicity use in the case of any railway. It is not enough for the association to stand ready to make an inquiry into any point raised by a company. It should be prepared not to get but to furnish information on the vital issues of the present situation, so that its assistance can be secured immediately when occasion arises.

Without doubt an opportunity exists for constructive work by the association and co-operative work by the companies along such lines as above indicated. There has been too little leading by the association; too much individualism among some companies in the efforts to establish better public relations; too much of an attitude on the part of some that such work is good for the other man if he is energetic enough to do it. The association ought now to assume the initiative in regard to general publicity, so that no company will have any legitimate excuse for not taking definite steps to better its relations with the public. The association has a well developed and efficient bureau of information, as Secretary Burritt points out in a letter in this issue, but its means for popularizing this information are lacking.

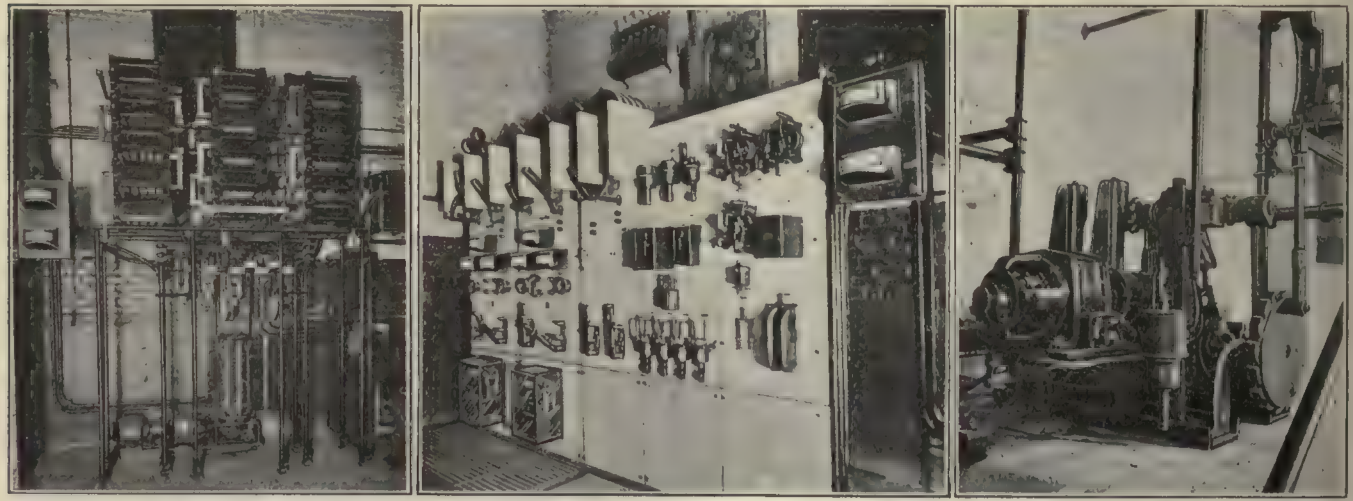
# First Automatic 1200-Volt Substation

**The Milwaukee Electric Railway & Light Company Has Installed Automatic Equipment in an Interurban Line Substation Which Controls Two Rotary Converters Operating in Series**

ONE interurban division of The Milwaukee Electric Railway & Light Company lines connects Milwaukee and East Troy, with a branch line running from St. Martin, a mid-point on the line, to Burlington, Wis. The territory served encircles a number of beautiful lakes which attract a rather heavy week-end travel, but both Burlington and East Troy are small towns, and hence the traffic over the division is not sufficient to warrant better than two-hour service during most of the time. The Burlington car is operated on a shuttle service, connecting at St. Martin with the through Milwaukee-East Troy cars which also meet at this point. Thus three passenger cars are operated normally on the entire division. The distance from both East Troy and Burlington to St. Martin is approximately 20 miles, consequently with two-hour service there are considerable periods during which there is no car operating on either branch and no demand for power.

This condition gave rise to the consideration of automatic equipment in the substations supplying energy to this division, but the fact that it is a 1200-volt line introduced some complication. Three substations, located one at West Allis, 8 miles north of the St. Martin Junction, and one each at the ends of the lines at Burlington and East Troy, supply the division with power in addition to that received at the Milwaukee end of the line. Of these three, the one at East Troy was selected for the first installation of the automatic equipment since the West Allis and Burlington substations are also used for a rather extensive distribution of commercial energy in those vicinities and require attendants regardless of the railway equipment.

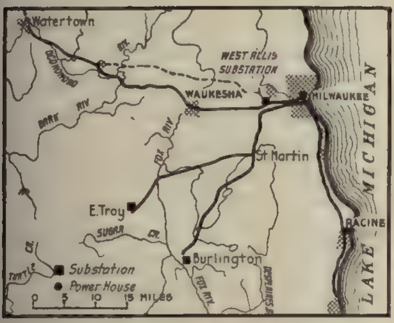
The East Troy station, built in 1910, is of brick and concrete construction, and for manual operation was equipped with four 300-kw. General Electric 25-cycle, 600-volt rotary converters, operating two in series. One set of these machines has been equipped with the General Electric automatic apparatus, and is now handling the load exclusively. The other set will be retained for the time being simply as a standby for use in case transformer or other trouble should make the automatic set inoperative. There is no necessity for retaining this set here and some consideration has been given to moving the two machines to a new location between present substations and operating them automatically there. This would make possible the removal of the 500,000-circ. mil-equivalent aluminum feeder cable which now parallels the trolley over a considerable portion of the line. At present prices this feeder would much more than pay for the new station, but another consideration enters. The substation at East Troy is served by a single transmission line, and if this should fail for any reason and leave the East Troy end of the line without a source of power supply, this feeder would still make it possible to move the cars at the end of the line on the direct-current energy supplied from the West Allis and Burlington substations. With the feeder removed, however, it would not be possible to run the cars with the East Troy substation out, except that a new substation located as mentioned would possibly reduce the trolley voltage drop sufficiently so that there would still be enough power at the end of the line to move a car and gradually to bring it within the range of the next substation.



AUTOMATIC SUBSTATION—FIG. 1—MOTOR-GENERATOR SET, CONTROLLER DRUM, MAIN LINE GENERATORS AND LOAD RESISTANCE. FIG. 2—CONTROL RELAYS ON TWO SECTIONS OF SWITCHBOARD ADDED TO FORMER BOARD. FIG. 3—OIL SWITCH AND CONTROL RELAY. MANUAL SWITCH IS JUST ABOVE

### Rearrangements Made for Automatic Operation

Very little change in the substation arrangement for the automatic equipment was necessary. All of the hand-operated switches were left operative, so that in case of necessity the machines can be started and operated manually. The new solenoid-operated switches were simply paralleled with the old hand-operated switches, which were moved to make room for the automatic starting contactor board seen in the photographs. Two sections of switchboard of the same type and style as the old board were added to accommodate the various control relays. The main oil switch controlling the incoming 13,200-volt high-tension line was changed from manual to automatic control and equipped with a mechanical permanent disconnect which operates in case of a heavy ground or short-circuit. A small motor-generator set completed the automatic installation. This provides the exciting current to control the polarity of the rotaries and also drive the control drum. The equipment also includes the main line contactors, the resistance grids, the bearing and resistance thermostats, the 5-kw., 13,200/220-volt transformer which supplies energy to the control equipment, etc.

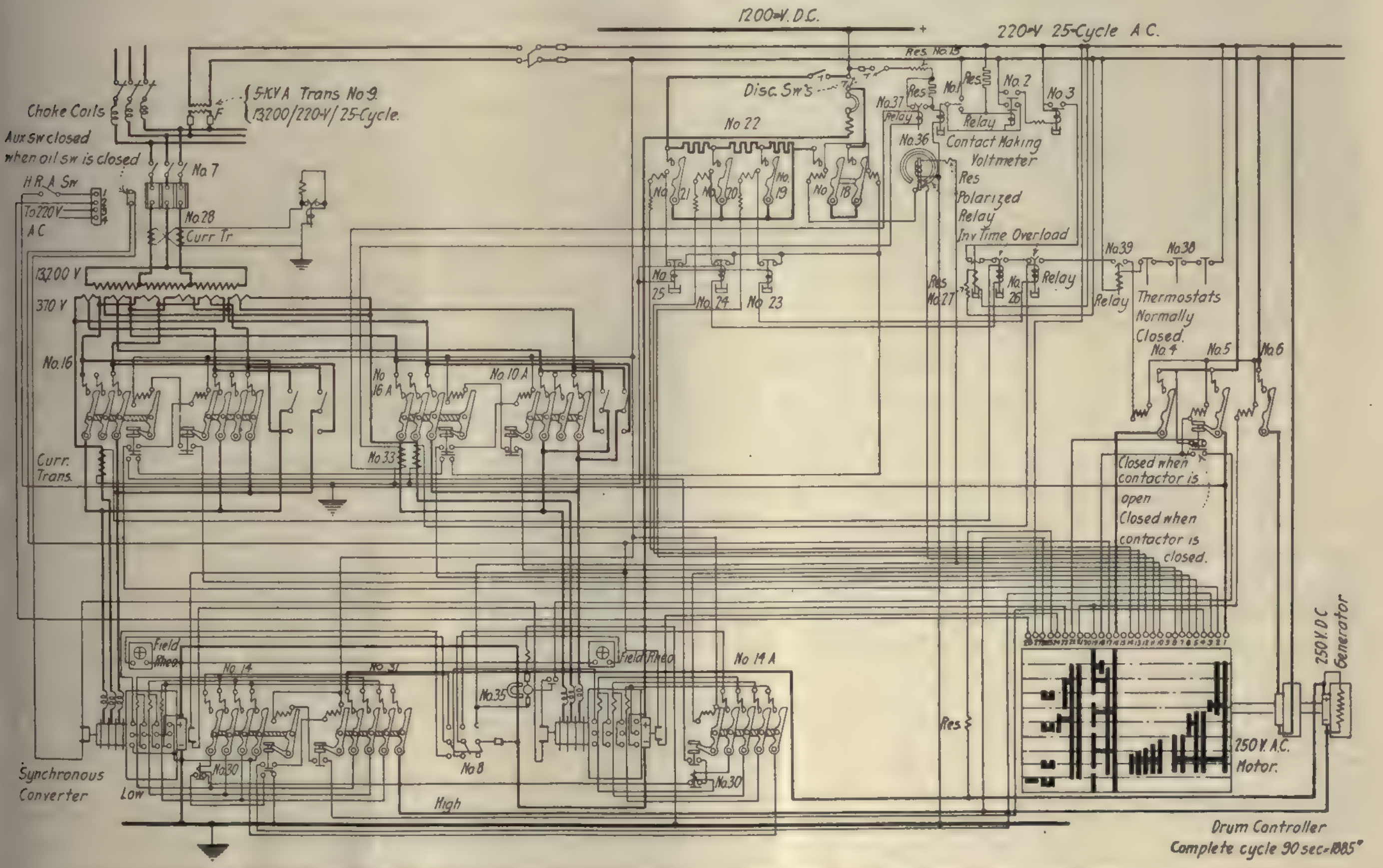


AUTOMATIC SUBSTATION. FIG. 4—MAP OF MILWAUKEE ELECTRIC RAILWAY & LIGHT COMPANY'S INTERURBAN LINES

Although the steps in the operation of the ordinary single-machine automatic substation have already been described in earlier issues of ELECTRIC RAILWAY JOURNAL, the sequence of operations in this two-machine automatic station will be of interest since the control involves many additional steps, although the theory and the equipment are the same except for expansion to cover the 1200-volt conditions. In general it may be said that a contact-making voltmeter cuts the machine in when the trolley voltage drops to 950. A current relay, which operates as the first step in shutting the rotary down, functions when the current drawn falls to 25 amp. A dash-pot relay, which keeps the machine on the line for a period after the moment the demand for current drops below 25 amp. in order that the ordinary passenger stop of a car will not shut down the rotary, is set in this station for five minutes and ten seconds. The time lag of the power supply behind the demand—that is, the time which elapses between the action of the contact-making voltmeter and the throwing of the converters on the line—is one minute and thirty seconds.

### SEQUENCE OF OPERATIONS IN 1200-VOLT AUTOMATIC STATION

Beginning with the machines off the line, everything inside the station is dead except the small transformer which supplies energy to the control apparatus and the contact-making voltmeter which, of course, is always energized. When the voltage drops below 950, the contact-making voltmeter, marked No. 1 in Fig. 5, closes

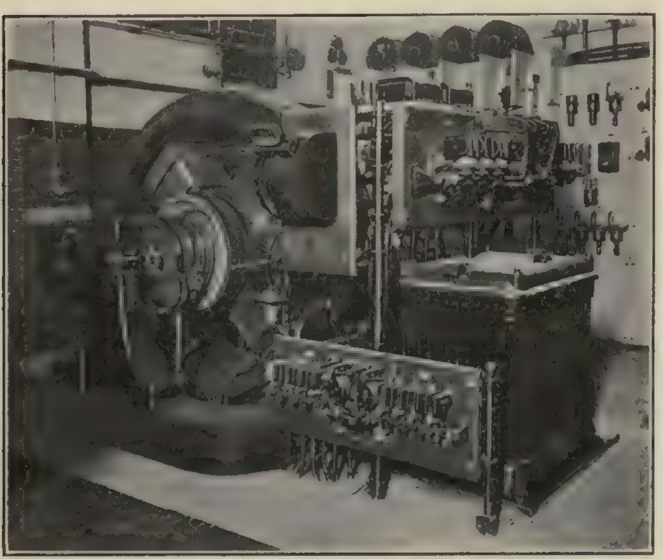


AUTOMATIC SUBSTATION FIG. 5—WIRING DIAGRAM OF 1200-VOLT AUTOMATIC CONTROL EQUIPMENT

*Key to Diagram*

1. Contact-making voltmeter.
2. Double-contact a.c. relay.
3. Dash-potted a.c. relay.
4, 5, 6. A.c. contactor, 50 amp.
7. Oil switch.
8. Triple-pole double-throw switch, 50 amp.
9. 5-kva. 13,200/220-volt tranfsormer.
10. Triple-pole starting contactor, 500 amp.
11. 300-kw., 600-volt rotary converter.
14. Four-pole a.c. contactor, 50 amp.
15. Resistance tubes.
16. 500-amp. three-pole running contactor a.c.
18, 19, 20, 21. 500-amp., 1200-volt, d.c. contactors.
22. Resistance boxes, 1.4 ohms.
23, 24, 25. Instantaneous overload relays.
26. Inverse time-limit overload relays.
27. A.c. low-voltage relays.
28. Current transformers.
31. Four-pole field exciting contactor.
35. D.c. reverse relays.

a circuit through the double-contact relay, No. 2. This in turn completes the circuit through the dash-pot relay, No. 3, which provides the time lag holding the machine on the line for five minutes after the demand for current falls below 25 amp. This third relay is called the master relay, since it really determines whether the machine shall be kept on the line or cut off. With No. 3 relay circuit closed, a circuit is completed through the low-voltage relay which cuts the machines off the line whenever the high-tension voltage drops so that on the 220-volt side of the control-apparatus transformer the voltage has fallen to 180. It also includes two overload relays, one for each machine. No. 39 relay is also connected in this same circuit and is held in the closed position by virtue of a separate circuit off the 220-volt bus, which includes the four thermostats, located on the bearings of the two machines and the two thermostats on the main resistance grids. If any of the thermostats opens the circuit, this de-energizes the No. 39 relay and hence cuts the machines off the line. With No. 39 relay and the previously mentioned relays closed, contactor switch No. 4 is energized and closed, supplying energy to the lower half of the main controller drum. As soon as energy is supplied to the drum, the No. 19 finger completes the circuit through the No. 6 contactor. This closes and energizes the small induction motor which is connected to the controller drum through worm and gear and direct-connected to the small 250-volt direct-current exciting generator. The drum then begins to revolve, and from then on all operations of the apparatus are controlled from this point. The several operations are so timed by virtue of the construction of the drum that each step is given time to complete its function before the circuit operating the next step is completed. The No. 18 finger on the drum is the first to make contact after the drum begins to rotate. This closes a circuit through the No. 5 contactor, which in turn closes the 220-volt circuit to the top half of the drum, and also an auxiliary circuit through all the overspeed cut-outs on the rotaries, the auxiliary control on the main oil switch and the reverse-current relay.



AUTOMATIC SUBSTATION—FIG. 6—STARTING AND RUNNING CONTACTOR BOARD ABOVE MACHINE, REACTANCE AND FIELD-CIRCUIT CONTACTORS AT BOTTOM OF PHOTOGRAPH

When fingers Nos. 1 and 2 make contact on the drum, the half-voltage-tap contactor on the ground-side rotary converter is closed. While the machine is coming up to speed, the drum continues to revolve until the No. 3 finger makes contact and closes a circuit through a contactor which puts current from the small direct-current generator having a fixed polarity through the field of the rotary. This current is supplied just long enough to determine the correct polarity of the converter, when it is disconnected and the main field switch of the machine closed, making it self-excited. This occurs at the same time the half-voltage contactor switch is thrown out and the full-voltage contactor thrown in. These last two contactors are mechanically and electrically interlocked and cannot be connected at the same time. The first machine at this point is operating at synchronous speed, and almost instantaneously with the closing of the full-voltage contactor on the first machine, the half-voltage contactor on the second machine is closed. The same process then follows through for bringing the second machine up to speed, except that its field is energized from the armature of the first machine. This is done because it makes it impossible for the second machine to polarize in the wrong direction and because it eliminates one field contactor. The field of the second machine is continuously excited from the first machine in order to limit the maximum pressure in the field coils of the second machine to 600 volts. If it operated under self-excitation the maximum voltage in the field coils would be 1200. With both machines up to synchronous speed, the last fingers on the controller close the main line contactors, throwing the machines on the line through resistance, which is then cut out by contactors in three successive steps at about one-second intervals.

When the current demand is below 25 amp. the current relay drops, short-circuiting the resistance in series with the contact-making voltmeter coil. This allows the voltmeter to take the lower position, short-circuiting No. 2 relay and allowing No. 3 relay to drop. The latter is retarded by its dash pot and does not break contact for the period of five minutes and ten seconds. When this finally opens, all relays are de-energized and the station is completely cut off back of the transformers at the main oil switch.

### Protection for Automatic Control

The operation of the automatic substation is protected against practically any trouble which might occur. In the first place, in starting up the machines and placing them on the line, if at any step in the operation the apparatus does not function, it is impossible for the next step to occur. Bearing thermostats on both of the machines set at 80 deg. C. will cut the machines off the line whenever the bearing temperature exceeds this setting. When the bearings have cooled down below this limit, the thermostats will make contact and the machines will again come in on the line, the cycle being repeated until the trouble is corrected. Three overload relays protect the machines against gradual overload. The first one of these is set at 500 amp., which is the full-load rating, and the other two have higher settings. As each cuts out, it cuts resistance in series with the trolley circuit and thus limits the load. If an overload continues, a thermostat placed on the resistance grid and set at 60 deg. C. will cut the station out when the temperature there has exceeded this setting. A reverse-current relay on the direct-current side will shut the station down in case of machine trouble or opening of the alternating-current line. The low-voltage relay cuts the station out in case the high-tension voltage drops seriously or is interrupted. If the low-voltage relay should not work, in this instance the reverse-current relay mounted on one of the machines, as seen in Fig. 7, would cut the station out. If there was an open circuit in the converter fields, the relays in the field circuits would open the circuit through the No. 18 contactor and the machine could not be thrown on the line, but would be cut off instead. After the machines are on the line, if the field circuit should open up in any way the machines would tend to run away and the overspeed devices would cut out the entire station. The control apparatus would then start to cut them in again, but could not get beyond the step in trouble. If the small direct-current generator should for some reason fail to excite the converter field, and the latter come up with the wrong polarity, the polarized relay would prevent the machine from being thrown onto the line. If the small generator failed and the rotary came up to speed with the right polarity, the operation would then go on and it would be thrown onto the line. In case of a dead "short" on the trolley, the overload trip onto the main oil switch would operate and would not come in again under automatic operation, because opening the oil switch from this source also opens a mechanically operated switch, Fig. 7, which can be closed only by hand. An overload relay connected in the alternating-current side of each converter is simply a check on the thermostat relay on the resistance grids. These also take care of the case where a gradual overload may not be severe enough to open the main oil switch, but too heavy to wait for the thermostatic cut-out to operate.

### SAVING REALIZED FROM AUTOMATIC OPERATION

The first cars over the East Troy division leave the opposite ends of the line at Milwaukee and East Troy at 6.15 and 6.20 o'clock respectively, and a two-hourly service is maintained thereafter until 8.20 p. m. The next and last cars leave at both ends at 11 p. m., the last car arriving at East Troy at 1.05 a. m. From this time until the first car in the morning the substation would be shut down under either manual or automatic operation.

When a car leaves East Troy for Milwaukee the automatic substation remains on the line for a period of approximately forty-five minutes, or until the car has reached a point approximately 16 miles from the substation. This is under normal traffic conditions with no other cars on the line. From the time a car leaves this point until the car from Milwaukee arrives at this point, which is approximately thirty minutes, the automatic substation is off the line. The cars then lay over at the East Troy end of the line for approximately thirty minutes, during which time the automatic again cuts out. As a result there is a total of approximately seven hours during the day that the automatic substation is cut out under normal conditions on the line when it would be running under manual operation. Since the automatic substation has been in operation considerable track work has been going on on this division, and the work trains operating have kept the substation on the line a good share of the time, so that it has been impossible to get any accurate figures of the energy saving which would be made under normal traffic conditions. However, the following estimate is considered to represent a close approximation of the savings, the principal factor being the elimination of two operators:

| | Manual | Automatic |
|---|---|---|
| Operating labor | $1,367.89 | $240.00 |
| Supplies and expenses | 241.26 | 61.56 |
| Maintenance substation and transformer equipment | 336.16 | 489.09 |
| | $1,945.31 | $790.65 |
| Saving | | $1,154.66 |

Automatic substation off line seven hours a day more than the manually-operated station.

40 kw. assumed as no-load loss for two 300-kw. rotaries.
40 × 7 × 365 = 102,200 kw.-hr. yearly energy saving.
102,200 × $0.006 = $613.20 saving in energy cost.
$613.20 + $1,154.66 = $1,767.86* yearly saving.

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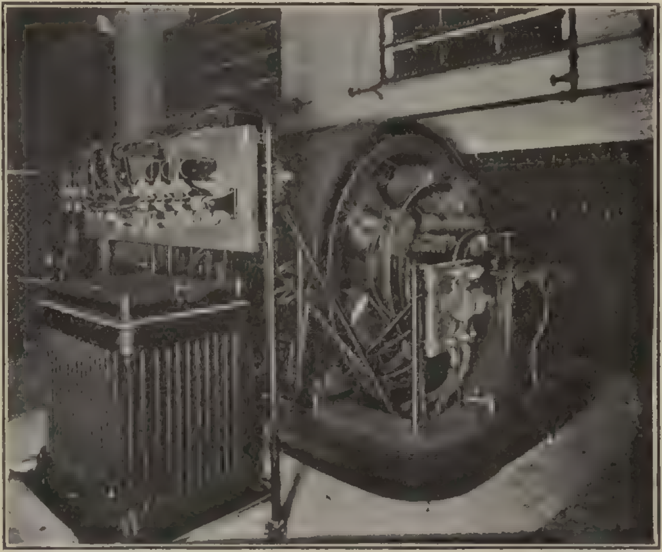
*This does not take into account the energy saving due to elimination of the iron and copper transformer losses which are also off the line seven hours a day additional to what they would be with manual operation. Nor does it include the energy saving in line losses during this additional seven hours of no energy flow over the high-tension line.

In the first item under "operating expenses" the $240 charged against the automatic substation for labor is made up from a small part of the time of a man who handles the express and baggage for the company and any line trouble occurring in the vicinity of East Troy. He is also available for any trouble which may occur in the substation. The third item covering "maintenance of the substation and transformer equipment" is higher for the automatic station than for the manual operation, since the equipment for lighting and commercial energy in this substation must be inspected and cared for by a traveling inspector, whereas under manual operation this was taken care of by the station operator but the cost is kept in a separate account.


AUTOMATIC SUBSTATION—FIG. 7—REVERSE-CURRENT RELAY AND BEARING THERMOSTAT ON SECOND MACHINE

The Boston Elevated Railway is mentioned in the annual report of Franklin Union as one of the companies having very large numbers of students at this young and vigorous industrial educational institution. The report shows that Franklin Union has completed nine seasons of instruction, and in that just closed gave instruction to 2056 different individuals at an expense of $43,761.40. The school is supported largely by the Franklin Foundation, consisting of funds bequeathed to the city of Boston by Benjamin Franklin.

# The How and Why of Publicity

## Every Publicity Effort Should Be Frank, Candid and Responsible—Chief Media Electric Railways Should Use in Present Momentous Situation

By IVY L. LEE

A FEW days ago one of the Washington newspapers published an advertisement evidently inserted by the Roumanian Commission to this country. The advertisement had no signature, and one would not have known that it was an advertisement if it had not been in display type and had not contained a lot of unnecessary verbiage which any intelligent copyreader would have cut out. It was clearly inserted because the news columns of the several days previous had failed to give as complete accounts of the reception of this Roumanian Commission as the commissioners felt was due the importance of their errand. They, therefore, worded their advertisement to read as if the newspaper itself were inserting it as a news article. The expressions, "We have learned" and "We shall not fail to advise our readers," were clearly used to give the readers such an idea.

The foregoing is a method of how *not* to do publicity. One of the fundamentals of any attempt at publicity must be to make it responsible. Any statement made to the public through the press should show clearly from whom the statement comes. If it is a statement on behalf of interested parties, the public should know clearly the source of the inspiration. If the public reaction from the article is then favorable, it redounds to the merit and the credit of the responsible party. If the public reaction is not favorable, the responsible source has at least been frank and deserves credit for its policy at least in that respect.

Some corporations are accustomed to prepare statements for the press as if the publication itself prepared the article. Of course, there may be times when it is worth while and perfectly legitimate to assist a newspaper in preparing its own matter. Anything said on behalf of a particular corporation or inspired by it, however, should in the interests of frankness and responsibility show its source.

It is also a very dangerous thing to issue articles to the press for publication when they are in the nature of comment upon the action or policy of the corporation giving out such statements. Comment should be made by the publication itself or by the public. The corporation should confine itself to telling what it has done and why it has done it.

### How Electric Railways Should Tell Their Story

These remarks are particularly pertinent at a time when electric railways of the country are likely to be telling their story of why their system of fares should be revised. Every statement put out to the public in any locality should be upon the definite responsibility of the company that is seeking to influence public opinion. The company should make it clear to the public that its purpose is to tell its own story and the whys and wherefores of its action. The company must prove its case.

This applies not only to newspaper statements but also to every form of publicity. Many people believe that the beginning and the end of publicity is in the newspapers. But the newspaper, while still supreme, is growing relatively less important each day. This is not because of any fault with the newspaper, but simply because so many other media of publicity are being developed. Moreover, the demand upon newspaper columns is so great that it is impossible through that means to reach the whole public with every important proposition which should be brought to public attention.

Every company which seeks frequently to bring its affairs to public notice should develop a mailing list of prominent citizens in its community, to whom direct statements on important subjects should be sent. The affairs of a public utility are not always exciting, and it is frequently difficult to give them that touch of original interest which Billy Sunday gives to any subject that he tackles. But if these are subjects which should be carefully considered by thoughtful people, and if responsible statements are made to representative citizens directly, tersely and attractively, they will be read and will receive careful consideration by many.

A great many companies neglect great publicity possibilities embodied in the issuance of their annual or even monthly reports. Such reports offer excellent opportunities to add a large amount of comment and interesting operating data that is likely to be read at such a time, whereas it might be considered gratuitous on other occasions. The report of the American Telegraph & Telephone Company in this respect is one after which all public utility corporations might well model their policies.

The great possibilities in car cards and in posters placed in the windows of cars are well known but seldom developed with infinite care. Probably these are the most direct and effective means of reaching the constituencies of electric railways. Nobody can avoid reading these cards or posters, and if they are changed with sufficient frequency they can be made a constantly increasing source of valuable information and education.

Every company should issue some sort of company publication, to serve as a medium of communication to its own employees, to its patrons and to the general public. In this way the company makes itself articulate and speaks with an authoritative voice to the whole community in which it operates. These company publications can be made most effective media of communication to the press, to commercial organizations, public service commissions and public authorities gen-rally, as well as to the public at large. Some compa- es, notably the Bay State Street Railway, the Wells argo Express Company and other corporations, both cal and national in their scope, are now using such ublications upon a fine plane to the great advantage of e companies themselves and the people that are eached thereby.

Public utility companies are just beginning to realize e value of the moving picture. There is a moving cture which tells the news of the day, and there is nother moving picture which relates stories and jokes. ut up to now the moving picture which corresponds the advertisement department of the newspaper has t yet been highly developed, and the audience for it s not yet been cultivated. There is a field here the normous importance of which will undoubtedly receive creasing attention.

### ELECTRIC RAILWAYS ARE AT THE PARTING OF THE WAYS

The foregoing are the principal media of communi- tion with the public. Of these, and all other methods reaching the people, the electric railway industry ould undertake steps to make use. The industry, as analyze it, is at the parting of the ways. It will be le in the next year or two to put itself on a basis here it can command private capital and thus continue operate in accordance with the progress of the art d to the satisfaction of the communities it serves. If is does not happen, municipal and government own- ship of electric transportation agencies cannot but be evitable.

The people should be made to see clearly the over- elming advantages of the present service and the esent system of ownership and operation. Unless e people are made to understand this clearly from eir own point of view, they certainly will not decide e issue merely with reference to the prosperity and e convenience of corporations conducting electric ilways.

The public has made up its mind apparently that it ll not permit great speculative profits to continue to made from public service properties. Such profits will be made in this line of enterprise in the ture will be based upon efficiency and ability of man- ement. If the public can be induced to encourage ivate capital by permitting it to retain the reward of initiative and enterprise, the electric railway in- stry can be saved.

The experience with government and municipal op- ation generally shows that the ultimate cost to the blic of most of such operations is really greater than uld be the case with private management and owner- ip, honestly and efficiently conducted. But that is the ynote of the whole matter and should form the basis r all public education.

This article has indicated what should be the main licy underlying the plan of publicity which electric ilways should now develop, and it has also directed tention to the chief media which should be employed. t most vital of all is the feature indicated at the ginning: that every effort of this kind should be ite frankly and candidly put forth and should, above else, have behind it the absolute responsibility of e person or company on whose behalf the work is ne.

## Taxing Public Utilities

### Franchise Taxes Should Be Avoided in States Where Policy of Regulation Has Been Adopted

A RECENT issue of *The Public*, "an international magazine of fundamental democracy" devoted to single tax and similar economic subjects, contains an article on "The Taxation of Public Utilities" by Morton G. Lloyd. In particularly discussing the usual inclusion of franchises with land values in single-tax campaigns, Mr. Lloyd says that if taxation is to be utilized to take for the public all the value which it gives to a utility franchise by its use of the utility, the tax must be high enough to absorb entirely the income representing this value. Otherwise it fails of its object.

But franchises, Mr. Lloyd states, like land titles, acquire value from their present or prospective ability to collect a toll from industry. If this power is definitely removed, the franchise loses value. Its taxation becomes unnecessary from the standpoint of conserving publicly created values for public use, and may even become objectionable. And the machinery for depriving franchises of value is already available, for the power to fix rates and service is the power to give values to franchise or to withhold such values.

In Mr. Lloyd's opinion, the rational attitude of the government in regulating a utility is to authorize rates for service which will provide revenue for reasonable operating expenses, depreciation and a return upon all necessary investment of capital. If there are no additional profits to be distributed, there will be no franchise value to tax. It thus rests with the regulating power to determine the existence of tolls which give franchises their value. Recognizing this, the framers of some of the state utility laws have included express stipulations that no allowance shall be made in rate-making for the value of franchises other than expenses actually incurred in securing them. Even then, however, when commission decisions are taken before courts for review, claims may be made that franchise values actually exist and will be confiscated unless recognized. Franchise taxes give color to such claims, and as under regulation they are passed on to the consumer and fail of their purpose, it would be better, Mr. Lloyd avers, to avoid them altogether in states where the policy of regulation has been adopted.

As to proper utility taxes, Mr. Lloyd suggests:

"The proper basis of taxation for utility corporations would seem to be the same as for other industries —the exemption of personal property and improvements and the imposition of a tax rate upon site values which shall absorb the economic rent. As temporary measures pending the attainment of this idea, it may be desirable to tax easements on public lands, as in Houston. Where rates are not regulated, it may be especially desirable to impose other taxes, such as one upon gross receipts or net profits, but it is best that this should not take the form of a franchise tax."

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On April 12 St. Joseph, Mo., celebrated her third annual trolley day. From 6 a. m. until 11 p. m. the Federation of Women's Clubs collected fares on the cars of the St. Joseph Railway, Light, Heat & Power Company. After 11 o'clock the federation received all the money taken in above the average day's receipts. This sum amounted to $431.80.

# Beginning the Freight Business Right

### The Cleveland, Southwestern & Columbus Railway Entered Upon This Branch of Transportation in a Big Way—Rates Higher Than Those Charged by Steam Roads Justified by Quick Service—Co-operation of Merchants Made Venture Successful from the Start

FOR several years the Cleveland Chamber of Commerce had been working with the Cleveland, Southwestern & Columbus Railway in an effort to induce the company to take up a general carload and package freight business over its lines, but not until late in 1916 did this seem feasible owing to various physical limitations, and to certain ordinance provisions which hampered the hauling of freight cars through the streets of Cleveland. These obstacles were finally reduced sufficiently, however, so that E. F. Schneider, general manager, was able to see how such business might be made a profitable supplement to his passenger traffic which was showing the inroad of the automobile. The physical property was accordingly made ready on the Southern division of the road, and on Monday, Oct. 2, 1916, the new freight service was inaugurated and two carloads, 40,000 lb., of merchandise hauled on the initial day.

Previous to this, a committee of twenty-five members of the Chamber of Commerce, comprising the wholesale merchants and manufacturers, made a two weeks' booster tour of the lines of this company, stopping at all the principal towns, addressing the local trade boards and, in general, enlisting the interest of the smaller-town merchants and selling them the service which the electric line was able to give to the various shippers through this territory. This co-operation of the Cleveland business men started the ball rolling, after which the consistent "better service" and the constant solicitation of the traffic department of the company resulted in a 50 per cent increase monthly for the first few months. More recently Mr. Schneider has been scouring the country for additional freight equi ment—good evidence of continued growth and expect tion for even greater profits ahead. With all the dif culties which usually accompany the beginning of new service and the trouble met in getting the routi for it working smoothly, the freight claims during th first three months of this freight service amounted 0.43 per cent of the gross.

## Over-Night Delivery the Slogan

One of the principal features of the inauguration freight service on the Cleveland, Southwestern & C lumbus line is the fact that the tariff was made a proximately 25 per cent higher than the steam railwa rates. This is justified by the very fast service whic the company is able to give. And it has been foun that the merchants were perfectly willing to pay th premium for this prompt shipment. Any package carload business received at any point on the line b closing time in the afternoon is delivered at its destin tion point when daylight arrives the following mornin Compare this with the steam road service from Clev land to Bucyrus, the southernmost terminal of the ele tric line, for instance, which requires anywhere fro one and one-half to four and one-half days. Simila comparisons might be made for all other towns on th electric line, and this of course is the feature which i duces the Cleveland wholesalers to ship and the smalle center dealers to specify shipment via the C., S. & Railway.

The regular freight schedule includes two trains eac way over the division every day, the principal freigh

DEVELOPING FREIGHT—THREE-CAR FAST-FREIGHT TRAIN ON CLEVELAND STREET

DEVELOPING FREIGHT—ASHLAND FREIGHT HOUSE. TYPICAL OF THOSE ON LINE

DEVELOPING FREIGHT—INTERIOR VIEW OF CLEVELAND FREIGHT HOUSE

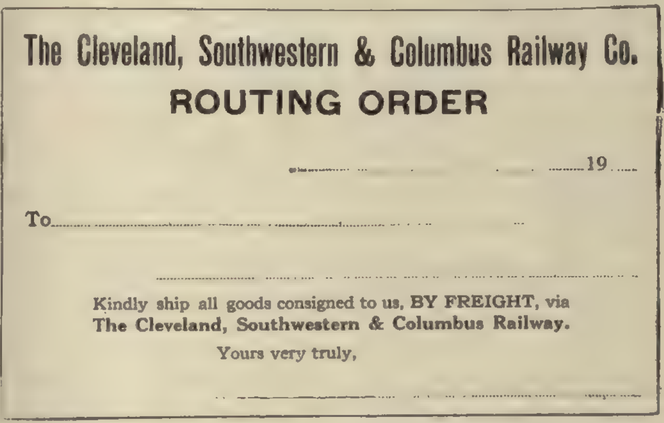
lovement being at night in order to avoid having the everal car trains on the Cleveland streets during the aytime when traffic is heavy. A morning train leaves leveland at 5 o'clock and makes local deliveries over e division to Seville, which is a junction point for a ranch line running to Wooster, and then continues on this destination. Returning, this equipment leaves ooster at 12.01 p. m., picking up local freight all the ay into Cleveland, where it arrives at 3.50 o'clock in e afternoon.

The other train out of Cleveland handles the longer-aul shipments on the line to Bucyrus. It leaves at p. m. and runs through to Seville and makes the local eliveries from there on to Bucyrus. Not more than ree cars can be hauled through the Cleveland streets, ut four and five-car trains are operated after reachg the city limits. Under normal traffic on the way uth, a car is sent off at Ashland and one at Mansfield, hd the third goes on through to Bucyrus. It is due ere at 2.50 a. m. and then lies over, unloading and ading for the return trip at 5.20 that afternoon, pickg up the Ashland and Mansfield cars en route and arving in Cleveland at 2.30 the following morning. The rough trains between Bucyrus and Cleveland meet West Salem and the crews exchange trains and go ack so that they are home every night.

The Southwestern line tariff has been made up to inude forty-nine different carload commodities, and inerchange arrangements have been completed with ur steam lines at eight points. Further interchange planned later on when the agents have become thoroughly familiar with the local business. No l.c.l. interchange with the steam lines has as yet been attempted.

### FREIGHT HAULING EQUIPMENT

Five motor freight cars, six box car trailers and a few flats and gondolas, constitute the present equipment available for handling freight on this 115-mile division of the railway, although other cars are under construction in the company shops at Elyria. The box cars are all 50 ft. long and built with automobile doors in the ends. They are of semi-steel construction and are built to standard M. C. B. dimensions.



**The Cleveland, Southwestern & Columbus Railway Co.**

**ROUTING ORDER**

..................................................19......

To..................................................................

..................................................................

Kindly ship all goods consigned to us, **BY FREIGHT**, via
**The Cleveland, Southwestern & Columbus Railway.**

Yours very truly,

..................................................................

DEVELOPING FREIGHT—ROUTING ORDER USED FOR ENCOURAGING BUSINESS

DEVELOPING FREIGHT—TWO SIDES OF CLEVELAND FREIGHT HOUSE

**The Cleveland Southwestern & Columbus Ry. Co.**

SOLICITOR'S DAILY REPORT

*Bucyrus, O.*, Station, *Dec. 8th*, 1916.

Chas. J. Laney, Traffic Manager,
Cleveland, Ohio.

Dear Sir:—

The following is a report of soliciting for above date:—

| Firm Called On | Person Interviewed | Remarks |
|---|---|---|
| Smith's Pharmacy | Mr. Smith | Explained in detail below. |
| Brown Bros. | Mr. Brown | Everything satisfactory. |
| Reed's Groc. | Mr. Reed | Explained in detail below. |
| Callahan Bros. | Mr. Callahan | Everything satisfactory. |
| C. E. Glass Groc. | Mr. Glass | Likes service, but had two fine bunches of bananas smashed and ruined. |
| Home Groc. Co. | Mr. Smith. | Geo. John advised these people to use our service and he is using it exclusively. |

Mr. Smith has been buying goods in New York and Columbus for thirty years and does not feel that he wants to change now.

The same reason as above applies to Reed's Groc.

D. S. Johnston.

DEVELOPING FREIGHT—TYPICAL SOLICITOR'S REPORT SHEET REPRODUCED IN TYPE

Some thirteen freight depots were built at Cleveland, Medinah, Seville, Wooster, Lodi, West Salem, Ashland, Mansfield, Crestline, Bucyrus, Gallion, Beroy, Berea, etc. Except for the more important ones, these freight houses are of frame construction and range in size from 18 ft. x 36 ft. at Lodi to 20 ft. x 110 ft. at Mansfield and 36 ft. x 140 ft. at Cleveland. They are all located close to the heart of the city they serve and are placed on a siding just off the main line. They all have a 6-ft. loading platform, an incline for loading stock, 5-ton Fairbanks automatic scales and standard four-wheel and two-wheel platform trucks.

The Cleveland station is located at the corner of Eagle and Ninth Streets, which is only three blocks from the corner of Euclid Avenue and Ninth Street, one of the most congested corners in Cleveland. This station, like the freight house at Mansfield, is constructed of hollow tile and brick, with an office at the front. The team way is on one side and the car tracks on the other. A single-track siding off the Ninth Street car line branches into two tracks beside the freight house and gives space for setting five cars for loading.

**The Cleveland Southwestern & Columbus Railway Company**

TRAFFIC DEPARTMENT

525 GARFIELD BLDG.

**Cleveland, Ohio.**

Gentlemen:—

Since starting the Freight Business on the Southern Division of our road, we have maintained the Fast Schedule placed in operation October 1st, 1916, in fact not in one single instance have we failed to make delivery as advertised.

Realizing that this one feature of our new departure has appealed to your needs, we wish to take this opportunity in thanking you for your patronage.

While it is our intention to keep right on giving you the benefit of our excellent service, it is also our desire to increase our shipments, and this can only be done by asking for more of your business.

We think this is the opportune time to advise you that our capacity is unlimited and that we can accept all Classes of Freight the same as any steam road. We are governed by the same Official Classification, our cars are all 50 feet in length and equipped with end doors for the loading of long articles.

We are prepared to handle all of your shipments in an efficient manner.

Remember the QUALITY of our SERVICE demands the QUANTITY of your business.

Very respectfully yours,
Traffic Manager.

CJL-GT

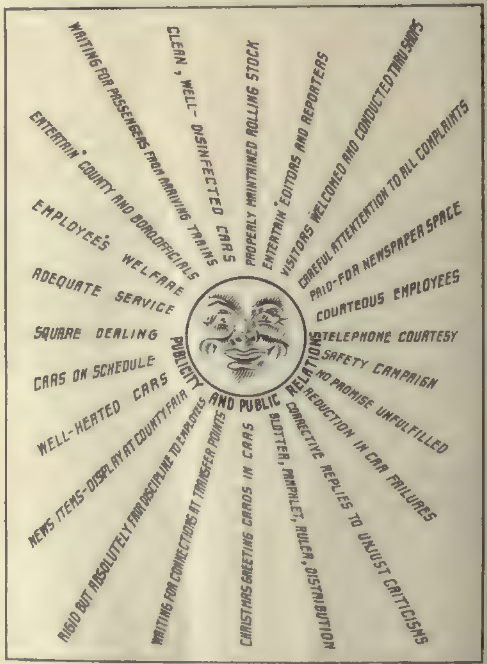
DEVELOPING FREIGHT—SAMPLE LETTER SENT OUT SOLICITING PATRONAGE

The principal effort devoted to increasing the freight traffic of the Southwestern line has been exerted through personal solicitation. Calls are made on present and prospective customers by a solicitor giving all his time to this work. A daily report sheet sent in to the traffic manager gives the names of the firms called on and just a brief remark as to the result of the inquiry and solicitation. Any complaint of the service is noted and steps are taken to correct this as soon as the notice reaches the traffic manager. A typical report sheet is reproduced herewith. By giving close personal attention to any dissatisfaction in the early days of the service, it was possible to eliminate promptly some of the deficiencies of the service and thus hold every customer once gained.

In addition to this personal solicitation, a series of letters was sent to prospective customers and present customers calling attention to the success the company has met with in maintaining its over-night service as advertised and asking for more business. Routing order blanks and stickers for pasting on packages to direct their shipment over the Southwestern line are supplied to all the shippers and consignees. A small amount of advertising was also carried in the newspapers during the early period of the service. But the principal aid in securing for the electric line a goodly share of the freight traffic in the territory served was the interest of the Cleveland wholesalers and manufacturers and the service rendered.

## How to Secure Better Public Relations

An enterprising electric railway—whose intelligence in fostering better public relations is inversely proportional to its smallness in size—has devised the accompanying diagram to present its ideas of the best means of promoting better relations between railways and the public. Some of the rays, it is said, may be more effulgent than others, but all of them give some light. The diagram as a whole may well be the subject of study on the part of many an electric railway official.


PUBLICITY AND PUBLIC RELATIONS
WAITING FOR PASSENGERS FROM ARRIVING TRAINS
CLEAN, WELL-DISINFECTED CARS
PROPERLY MAINTAINED ROLLING STOCK
ENTERTAIN EDITORS AND REPORTERS
VISITORS WELCOMED AND CONDUCTED THRU SHOPS
CAREFUL ATTENTION TO ALL COMPLAINTS
PAID-FOR NEWSPAPER SPACE
COURTEOUS EMPLOYEES
TELEPHONE COURTESY
SAFETY CAMPAIGN
NO PROMISE UNFULFILLED
REDUCTION IN CAR FAILURES
CORRECTIVE REPLIES TO UNJUST CRITICISMS
BLOTTER, PAMPHLET, RULER, DISTRIBUTION
CHRISTMAS GREETING CARDS IN CARS
WAITING FOR CONNECTIONS AT TRANSFER POINTS
RIGID BUT ABSOLUTELY FAIR DISCIPLINE TO EMPLOYEES
NEWS ITEMS-DISPLAY AT COUNTY FAIR
WELL-HEATED CARS
CARS ON SCHEDULE
SQUARE DEALING
ADEQUATE SERVICE
EMPLOYEE'S WELFARE
ENTERTAIN COUNTY AND BORO OFFICIALS

A GRAPHIC PROGRAM FOR BETTER PUBLIC RELATIONS

# The Problem of Vehicular Interference

### The Author Points Out the Loss to the General Public Through Avoidable Delays Caused by Vehicular Interference and Advocates an Effort by Electric Railways to Bring About a Better Understanding of the Principle Underlying the Public Utilities' Superior Rights

By FREDERICK W. JOHNSON

THE day would seem not far distant when an energetic effort will have to be put forth to disentangle the surface railway systems of our larger cities from the throttling effects of slow-going vehicular travel. It is perhaps no exaggeration to say that, unless a practicable solution is found for certain of the more pressing phases of the evil, some of the functions of the surface railway may pass, in part at least, to other mediums of travel more responsive to the requirements of our admittedly intensive mode of living.

One of the most pronounced characteristics of our national temperament is to be observed in a seemingly insatiable demand for speed in almost everything which enters into the conduct of our daily life. The remarkable popularity of the recent jitney invasion is a good example of the case in point. For a time many professed to believe that the strength of this movement rested upon the novelty of riding about town in an automobile. Nothing else could have been further from the fact. Approximately 50 per cent of the charm of the jitney lay in the fact that one was generally available for immediate use. About 40 per cent lay in the fact that few stops were made en route, while not to exceed 10 per cent found its root in the novelty of the situation. All of the great disadvantages of the service were lost to the popular mind in its unyielding quest for rapid transportation. One were worse than blind to shut his eyes upon so illuminating an insight into the transportation horizon of the future.

## HANDICAPS IN PROVIDING SERVICE

Of several serious handicaps with which surface railways have had to contend in their effort to meet the popular demand for rapid and uninterrupted service, none has proved so difficult of solution or so demoralizing in its influences as has the wide latitude allowed the individuals in the use of public highways. Municipal authorities have been slow to recognize the almost intolerable consequences of a too lax regulation of vehicular street traffic, and where independence of action by individuals is carried to its logical conclusion the public is placed in the position of standing in its own light. Sooner or later the privileges and conveniences of the individual must be subordinated, in some measure at least, to the rights and conveniences of the great number. Certain it is that the great army of trolley patrons will not always be content to abide the pleasure of the individual who chooses to conduct himself in his own peculiar ways, even if this does happen to obstruct the flow of the public travel. Herein, it is to be observed, lies the key to the situation, because in the final analysis it is to the people themselves that appeal must be made for the originating power and authority which they alone possess.

Under the broad hypothesis that the popular demand is for rapid and dependable transportation, that it is both the duty and the desire of the utility to comply with this obligation, and that the chief obstacle to its fulfillment centers in the perpetual encroachment of vehicular travel upon the common right of way, it may be well to examine in some detail the various elements which enter into the problem. In addressing the subject it will here be treated purely as an operating proposition, disregarding for the moment any serious consideration of the safety factor, although the cause of he latter must appreciably be advanced by any resulting good that may accrue to the former. Many of the points cited, perhaps most of them, will instinctively suggest their own remedies without extended comment, and while not all will be found to apply to any given situation, some at least may prove helpful or suggestive. Turning first to the more common types of avoidable traffic delays, there are encountered such old stand-bys as (a) the practice of dragging cars, (b) obstructive curb deliveries, (c) horse watering troughs, (d) vehicles parked too close to the track, (e) collisions caused by drivers cutting across the path of moving cars, (f) holding the rail at intersections, (g) moving excessively heavy objects during the daytime, (h) overloading of vehicles by truckmen during bad weather, (i) pushcarts so located as to divert vehicular traffic to the car tracks, and (j) bucking directional traffic.

In the aggregate these causes of delay offer sufficient material for the most energetic kind of missionary work. Many lesser evils will automatically be eliminated once encouraging progress is achieved in the solution of those of a more acute nature. Banish the long-cherished theory that the individual traveler on the highways is a law unto himself and substitute in its stead the more equitable axiom of "the greatest good to the greatest number," and much that now seems difficult of accomplishment will speedily be accepted by the public mind as being both reasonable and just.

## RESULTS OF TRAFFIC INTERRUPTIONS

The immediate results of serious traffic interruptions may be summarized briefly as public dissatisfaction with the service and press criticism, which arise from disturbed schedules, irregular spacing of cars, missed connections and congestion at transfer points and terminals. In addition, there is an effect upon receipts and an increased accident hazard due to fast operation, while not infrequently there are power overloads.

It is one of the peculiarities of the business that, following a blockade, the very cars which should be turned short of their customary destination at the earliest possible moment invariably are so well filled that it is impossible to do so without still further incurring the displeasure of patrons. Again, unless strategically located line cuts are available, it may even happen that a goodly portion of the service of the line affected may be proceeding in the reverse direction to the demands of travel, particularly if the delay has occurred during or immediately preceding the rush-hour period. Instances are of record in almost every city where the most elaborate preparation for the handling of special events have been hopelessly disorganized because of untimely intervention of some occurrence of this nature.

There are yet other forms of avoidable traffic delays which would appear to be susceptible of successful attack. The present situation in the business world has resulted in the requisitioning of almost everything at all available in the shape of rolling stock and horseflesh. Quite naturally this has returned to active duty much that had once been relegated to the scrap heap as being unserviceable. Such a condition must inevitably bring about an abnormally high percentage of failures and breakdowns upon the public highways. Long-neglected paving defects, also, often intensify a situation already sufficiently troublesome. In particular, steam shovels and concrete mixers are a problem, instances having occurred where an entire section of a city has been deprived of transportation because of the maneuvering of such equipment into excavations that abut the rails or because it has been jammed beneath bridges with insufficient clearance or has been brought in contact with the overhead construction. Rigid regulation of the routes to be followed and of the hours during which cumbersome objects may be moved, preferably late at night, would seem to be the only practical solution of this menace to public travel.

The pernicious custom of using the car tracks as a driveway reaches its greatest height in cities where the track gage conforms to the wagon gage and where the rail is of a type that lends itself readily to the practice. Thus, the plan of using asphalt or wooden blocks for the shoulders and Belgian blocks for the space between the rails dovetails nicely with the average driver's conception of the real purposes for which car tracks were originally designed. Wooden block is the most treacherous and the most dangerous pavement that a city can lay, and for this reason it is the least to be desired upon car-tracked streets, because of the frequent blocking of the cars by fallen horses, stalled loads and skidding automobiles. On bridges, approaches and grades, where difficulty is encountered incident to drivers that follow the rails, gratifying results have attended the scheme of sanding the cartway as a means to attract vehicles from the track when there is snow or ice upon the ground.

Street excavations that abut on car tracks have long been a thorn in the side of the transportation man. At best such excavations necessarily divert all traffic to the car tracks. Therefore, wherever feasible, it would seem the thought of wisdom for city authorities to detour vehicular traffic over paralleling thoroughfare, provided such detouring will not produce undue congestion upon other car-tracked streets.

The adequate safeguarding of highway excavations at night is of sufficient importance to railway companies to warrant their checking up at close intervals upon the methods pursued by contractors. Blind approaches formed by huge piles of building material upon the highway are yet another menace that requires close scrutiny because of the danger of vehicular collisions and consequent interruption of service. Not only should the railway itself avoid opening intersections in congested areas at times inconsistent with the best interests of the transportation department, but it should as well so place its equipment and materials as to offer the least possible obstruction to the normal flow of vehicular and pedestrian travel.

### Rights of the Public Utility Are Superior

In general, the conflicting rights of all may be better served if a clearer and more thorough understanding be established in regard to rights of each. There is a middle ground upon which all may meet, and it would seem distinctly within the province of the railway to take the initiative in bringing about an understanding of this fact.

Without seeking to involve the chief controlling issue in an entangling maze of legal decisions, it may be permissible to quote the following excerpt from the opinion rendered from the Pennsylvania Supreme Court in 1892, not only because of its vision and clarity of thought, but also because of its peculiarly fitting application to precisely the same state of affairs a quarter of a century later. The italics are the author's:

"There is this distinction to be observed between steam railroads and street railways. In the case of the former, they have exclusive right to the use of their tracks at all times and for all purposes, except at road crossings. Street railways have not this exclusive right. Their tracks are used in common by the street cars and the traveling public. While this common use is conceded, and is unavoidable in towns and cities, the railway companies and the public have not equal rights. *Those of railway companies are superior.* Their cars have the right of way, and it is the duty of the citizens, where on foot or in vehicles, to give unobstructed passage to the cars. This results from two reasons: First, the fact that the car cannot turn out, or leave its track, and secondly, for the *convenience and accommodation of the public.* These companies have been chartered for the reasons in part, at least, that they are a public accommodation. The convenience of an individual who seeks to cross one of their tracks must give way to the convenience of the public. It would be unreasonable that a carload of passengers should be delayed by the unnecessary obstruction of the track by a passing vehicle."

A powerful incentive to action is bound up in these few lines, because through them we glimpse conditions as they should be and as they ultimately must be if the future of the street railway is to rest secure. It is idle for any community to permit a small minority of its residents thus to frustrate the demands of the whole by denying to its servant the opportunity of complying with them. But to this end there must be a real demand from the public itself for the enactment of wise legislation governing street traffic and an insistence for its rigid and impartial enforcement.

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In the recent Liberty Loan campaign the Doherty organization purchased $1,250,000 of the bonds and aided the campaign still further by financing Ruth Law's airplane trip in the Middle West to stimulate the bond sales. In addition to the above the directors of the Cities Service Company, at a meeting held in the office of Henry L. Doherty & Company on June 20, voted to create a fund of $250,000 for the American Red Cross.

## New York Line Secures Increase

### Desired Relief Granted by New York Second District Commission to Nassau County Lines of New York & North Shore Traction Company

WITH commendable promptness the Public Service Commission for the Second District of New York has granted in full the various increases in fare which the New York & North Shore Traction Company petitioned for its lines in Nassau County. The last hearing on the matter was held on June 15, and the decision was rendered on June 26. The company has applied also for a 7-cent fare in Queens Borough, New York City, under the jurisdiction of the First District Commission, and its application for relief is scheduled to be taken up by this commission on July 16.

In 1915 the company applied for permission to increase its fare from 10 cents to 15 cents between Port Washington and Mineola, but in view of certain franchise restrictions the commission decided that it did not have authority to fix a higher rate. After some time this determination was reversed (175 App. Div. 869) by the Appellate Division, Third Department, as noted in the ELECTRIC RAILWAY JOURNAL of Feb. 3, 1917, page 210. Accordingly, on May 23, 1917, the company applied for the authorization of a fare of 20 cents for a continuous ride between the city line (Little Neck) and Mineola, and also between Port Washington and Mineola, and 12 cents for a continuous ride between Mineola and Hicksville.

The company contended that while it was giving more service than was required by its franchise, this was necessary for the convenience of the public, and it would be a hardship if the service were decreased. The territory in Nassau County is very sparsely settled, and there has been little or no development there since the railway was built. The increased use of the automobile has caused a very substantial decrease in the earnings of the company in the last two years. Because of the small earnings, the company has not been able to keep the roadbed and equipment up to the proper standard. Moreover, it has not earned enough to enable it to set aside a proper amount for depreciation. For the years ended June 30, 1915 and 1916, the company earned $2,111 and $2,032 over fixed charges. No dividends were paid to stockholders during these years. For the ten months ended April 30, 1917, the deficit after paying fixed charges was $7,093. For the eleven months ended May 31, 1917, the deficit was more than $8,900, as compared to a net income of about $1,500 the year before.

In its opinion the commission states that it is very apparent from the evidence that the company is failing to earn its bond interest, and from the commission's knowledge of conditions this state of affairs may continue for a considerable period. Particularly is this true if the company makes any effort to keep the property in reasonably good operating condition, and also endeavors to provide any depreciation reserve. On the assumption that the company has invested in the public service at least $1,599,350, which is the amount represented by $770,000 of bonds and $829,350 of stock authorized by the First District Commission (which has jurisdiction in the matter), it will be seen that the company would have to earn at least $79,967 to give a return of only 5 per cent on this valuation. This makes no provision for depreciation reserve and allows nothing for surplus and a reserve for contingencies. The commission states, however, that the company never earned even such an amount during the last five years, the maximum being approximately $49,500 in the year ended June 30, 1915.

The commission concludes, therefore, that the proposed increases, which are estimated to bring in approximately $8,850 of additional revenue per annum, are not unreasonable or unjust. The commission has approved certain revised fare zones, four in number, at 5 cents each, between Mineola and Port Washington and likewise between Mineola and the city line (Little Neck). The distances will be in the first place 2.32 miles, 2.38 miles, 2.54 miles and 3.25 miles, or a total without overlaps of 9.69 miles for a continuous 20-cent ride; and in the second place 2.60 miles, 3.27 miles, 2.54 miles and 3.25 miles, or a total without overlaps of 10.16 miles for a continuous 20-cent ride. Between Mineola and Hicksville there will be two zones of 3.74 miles and 4.09 miles at 6 cents each, or a total without overlaps of 6.77 miles for a continuous 12-cent ride.

## Recruiting Car in the Wyoming Valley

### The Wilkes-Barre (Pa.) Railway Recently Aided in a Successful Campaign for Army Recruits

WHEN President Wilson made his recent appeal for 70,000 recruits for the United States army, the Wilkes-Barre Railway Company immediately undertook to equip and furnish to the recruiting officers a portable recruiting station that could be used at any point on the 135 miles of railway comprising the company's system in the Wyoming Valley of eastern Pennsylvania. The equipment consists of a standard trolley car fitted up inside to serve as an office and provided with exterior decorations as shown in the accompanying cut. This car was widely advertised and was regularly scheduled to reach the various towns touched by the company's lines at specified dates. Frequently music was furnished by volunteer bands, and at each point prominent representatives of the locality made patriotic speeches, the car then being thrown open to receive applications from recruits. The car was accompanied by regular army recruiting officers, who occupied it at all times and made verbal appeals for enlistments, and as a result a large number of young men have signed for the various services.

RECRUITING CAR FURNISHED BY WILKES-BARRE RAILWAY TO STIMULATE ENLISTMENTS

# Better Public Relations for London

### Reorganization of Municipal Tramway System Provides for New Development and Publicity Section—British Technical Press Lauds "Great and Intelligent" Public Relations Work of American Companies

THE London (England) County Council, in adopting the proposal of its highways committee to include a development and publicity section in the reorganized London tramway system, has made an enlightened departure in British municipal tramway management. As stated in a preliminary notice in the "London Letter" in the ELECTRIC RAILWAY JOURNAL of April 7, it is planned that the existing ten sections of the London County Council Tramways shall be merged in five departments—traffic, electrical, rolling stock, permanent way and general. The traffic branch is to have a development and publicity section, the highways committee being of the opinion that more newspaper advertising and publicity work generally would be advantageous.

#### WHY THE TRAFFIC BRANCH SHOULD BE REORGANIZED

From the full report of the highways committee now available, it can be seen what an important part development and publicity work is to play under the new plan of organization for the great municipal tramway system in London. In the opinion of this committee, it is vitally necessary for a most efficient staff to be furnished to deal with all traffic matters. It is felt that the organization should be sensitive to every change, actual or prospective, whether in relation to the requirements of the traveling public or to traffic conditions generally.

Under the old organization, the traffic assistant and the two district superintendents, while rendering most zealous service, were compelled under pressure of circumstances to devote too much time and attention to matters of daily routine. Through want of a staff capable of relieving them of such work, they were unable to spend sufficient time on the road or to compile and study returns of traffic with a view to its improvement. The highways committee, therefore, arrived at the conclusion that the work of the traffic branch should be reorganized in two sections: (1) A development and publicity section, to deal with matters which have not hitherto received adequate attention, and (2) an operation section.

#### PROPOSED DEVELOPMENT WORK

According to the highways committee, the requirements of the public and the possibilities of the tramways undergo constant change, owing to growth and migration of population, growth and decadence of shopping and industrial centers, and other causes of alteration in the flow of passenger traffic. All such changes must be catered to and, if possible, anticipated, and it will be a primary duty of the development and publicity section to obtain the necessary data on which action should be based. Moreover, it is realized, the London tramways have to compete for traffic with other means of transit, and the development of the undertaking on successful lines must to a considerable extent depend on constant and well-directed effort to adjust the services to public needs. Such matters as through-running, through-booking, interconnection with other undertakings, nature and adequacy of services, fares and fare zones should be dealt with in this section as matters of development.

#### PUBLICITY WORK IS DEEMED IMPORTANT

The highways committee attaches equal importance to the publicity work to be undertaken in the development and publicity section. In 1913 a firm of advertising contractors offered to advertise the Council's tramways at a cost, roughly calculated, of $115,000 a year. In the following year an advertising scheme involving the expenditure of about $30,000 a year was submitted by another firm. These offers were not accepted. The chief officer of the tramways is now of the opinion that to advertise the service adequately would involve the expenditure of from $75,000 to $100,000 a year. While not wishing to prejudge the question of the amount which should properly be appropriated for publicity service, the highways committee is satisfied that, apart from other forms of publicity, greater use should be made of the press as a means of conveying to the public the advantages peculiar to the tramways service. Newspaper articles should be encouraged and suitable matter prepared; new and altered services should be advertised in the press, and attractive tramway maps and guides should be distributed.

It is felt that the preparation of time tables should also be undertaken in the development and publicity section. To enable this work to be done scientifically and with the fullest regard for the requirements of the public and the possibilities of the service, the head of this section should be furnished by the head of the operation section with all traffic data and statistical information required.

The adopted plan provides for a principal officer (directly responsible to the traffic manager) to be designated as the "development superintendent," at a salary from $2,500 to $4,000 a year. He should have under him at least three responsible heads of subsections: (1) a publicity assistant (from $1,500 to $2,000 a year); (2) an officer in charge of matters relating to fares and independent traffic checks (from $1,500 to $2,000 a year), and (3) a time table assistant (from $1,250 to $1,500 a year).

#### OPERATION SECTION IS EXPECTED TO CO-OPERATE

The other or operation section of the traffic branch, under the immediate and close supervision of the traffic manager, would be in effect the present traffic section, with its work of giving service, inquiring into complaints, etc., making special traffic checks, and preparing statistical and other information likely to assist in securing the most satisfactory results in connection with traffic operation. There should be, it is said, a smooth channel of communication of statistics and information from this section to the development and publicity section.

#### HOW THE BRITISH TECHNICAL PRESS VIEWS THE CHANGE

In commenting upon the foregoing features of the reorganization, the *Electric Railway and Tramway Journal* states that hitherto British tramways have been too self-contained and too reticent as regards both their merits and their faults. Continuing, this paper says:

"In this respect we have lagged far behind the street railways of the United States of America, where the companies which control those undertakings have for some time past paid great and intelligent attention to their relations with the public. It may be that in this country, where the majority of the tramways are owned and operated by the municipalities themselves, there has grown up a feeling that if the tramways committee and the manager satisfy the Town Council and make the undertaking pay, they have done all that can be expected from them. But we venture to think that this idea is not well-founded, and that the tramway undertaking should make the public its partner by taking it into its confidence at all times, in the same way the successful store does.

"A clever publicity man would always find ways and means of keeping his undertaking in pleasing evidence. He would talk to the people through the local newspapers, point out the pretty spots reached by the cars, apologize for any delays which might arise through storms, snow or breakdowns, let parties now and then see the power station and its wonders, invite the press to witness the night work at the sheds, and in a hundred other ways make the public feel that they are 'in it' and not headed off as nuisances and foolish grumblers.

"In London much of this sort of thing has been done and is being done by the Underground Electric Railways and the London General Omnibus Company, with excellent results for those concerns. As the London County Council Tramways are 'up against' these ably-managed undertakings, they must adopt a similar policy and try to do it better than their rivals."

## Progress of New York Fare Hearings

### In Whole State the Week Has Been Generally One of Adjournment for Hearings on Increased Fares

As stated in last week's issue the chief topic of discussion at the first hearing on July 6 before the Public Service Commission for the Second District of New York on the application of twenty-eight electric railways for a 6-cent fare was the procedure to be followed in presenting the cases. The question was also raised, however, as to whether the commission has power to increase fares in spite of old maximum rate statutes and provisions in certain local franchises. This question was taken under consideration by the commission, and the hearing was adjourned until July 13 at Albany.

In the First District, New York City, the hearing scheduled for July 9 on the application of the Third Avenue Railway for a 2-cent transfer charge was adjourned until July 23 in order to allow the company to finish the preparation of certain operating and valuation data desired by the commission and the city. The commission announced that it hopes to take a recess during August, and the beginning of the New York Railways and Brooklyn Rapid Transit Company hearings in regard to a transfer charge was postponed until Sept. 10.

The beginning of the hearings on the applications of the Staten Island Midland Railway and the Richmond Light & Railroad Company has been adjourned until July 16. These companies, which control the surface lines on Staten Island, have asked for a 6-cent fare.

## Red Cross Cars on the Pacific Coast

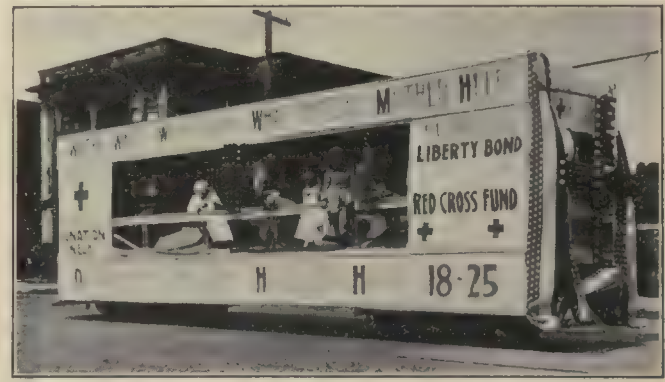
### Contributions to Red Cross Fund Stimulated by San Francisco-Oakland Terminal Railroad and Puget Sound Company

DURING the recent campaign for contributions to the national fund of the American Red Cross the San Francisco-Oakland Terminal Railroad operated in the city of Oakland a car that was especially fitted up to aid the movement. The car, which was provided with huge signs as shown in the accompanying illustration, was operated daily over the company's tracks in the downtown district of Oakland, and, as was to be expected from the publicity thus given to the campaign, the results were immediate. One of Oakland's business men, after seeing the car pass his office, telephoned to Red Cross headquarters to ask how large a subscription would be accepted and, when told that there was no limit, sent in $300. He said that he had never given serious thought to the matter of the activities of the Red Cross organization until this car attracted his attention.

COMPLIMENTS S. F. O. T. R.R. CO.
EVERY DOLLAR MAY SAVE A LIFE
SUBSCRIBE TODAY TO THE RED CROSS

RED CROSS CAR OPERATED BY SAN FRANCISCO-OAKLAND TERMINAL RAILROAD

In the lower of the illustrations there is reproduced a Red Cross car that was operated by the Puget Sound Traction, Light & Power Company, Seattle, Wash., over its lines in that city during the week of June 18-25, in the interest of the campaign to obtain $300,000 in Seattle for the Red Cross. It may be interesting to note that Seattle exceeded its apportionment of $300,000 by more than $200,000. The car is a work car with open sides and a cab at each end. It is 34 ft. long and 8 ft. 8 in. wide. The signs on the car were devised by the Red Cross organization without regard for the feelings of those subject to the forthcoming draft.



RED CROSS CAR DONATED BY PUGET SOUND TRACTION, LIGHT & POWER COMPANY

## COMMUNICATIONS

### Determining "Slack" in a Schedule

Stone & Webster

Boston, Mass., July 3, 1917.

To the Editors:

The paper by C. H. Koehler on "Determining the 'Slack' in a Schedule," appearing in the Electric Railway Journal of June 16, 1917, suggests very interesting possibilities of further refinements in the making and adjusting of electric railway schedules. Far too little attention has heretofore been given to the determination of efficient speeds to fit widely varying traffic conditions during different hours of the day, resulting often in adherence to fixed schedules, too fast for heavy traffic and inefficiently slow for light traffic. Mr. Koehler's paper points out with commendable clearness and conciseness the applicability of car recording watt-hour meter records to such schedule studies.

The application is not, however, so simple as it at first appears. The paper prescribes a certain field within which efficient operations, expressed in co-ordinates of schedule speed and power consumption, should lie. If without this field, it is either inefficient or else physically impossible. This field is shown in Fig. 2 of the paper, being the area inclosed within so-called "performance" curves and extreme "equivalent-service" curves.

It should be pointed out that the curves shown apply only to a particular type of equipment with a constant loaded car weight and assume for all traffic conditions a high rate of acceleration and braking. The last assumption implies effective training of motormen in car operation, and is, even then, difficult of realization under ordinary conditions. The car meters referred to have been quite extensively used to effect economy in power consumption, and this economy is very largely brought about by increasing the prevailing rates of acceleration and braking. With meter records of motormen's performance showing frequent variations of 25 per cent or more in kilowatt-hours per car-mile for similar service conditions, aside from the differences necessarily arising from traffic fluctuations, it would seem desirable to study the possible effect of individual efficiencies upon the performance area which Mr. Koehler has developed before applying it to definite traffic and schedule problems.

It is a simple matter to produce other curves, similar to Fig. 2 in the paper, for other rates of acceleration and braking, ranging from 1.25 m.p.h.p.s. (the minimum rate specified by Mr. Koehler) up to, say, 2.5 m.p.h.p.s., the latter rate being in use on certain light-weight, one-man cars with perfect comfort and safety.

It is not likely that there should be any change in the maximum performance curve with varying rates of acceleration and braking, the limit being set by the characteristics of the particular equipment, which are, of course, independent of the efficiency of power application. On the other hand, it would seem that the curve of most efficient performance would be affected by varying rates of acceleration and braking to an extent that is worth consideration. This curve is derived from Fig. 3, which shows combined power and platform labor costs for different schedule speeds. If acceleration is greatly increased the result is either slightly less power consumption for the same schedule speed or a slightly higher speed for the same consumption. Assuming the latter, we have the same efficiency curves in Fig. 3 as before, but they apply to slightly altered "equivalent service" curves—higher for increased acceleration. The effect would be to shift the curve of most economical performance in Fig. 2 to the right for higher rates of acceleration and to the left for lower rates, giving respectively a narrower and wider performance area. No calculations have been made to show the extent of the effect of varying acceleration rates upon the width of the performance area.

As Mr. Koehler states, the effect is small within the ranges in acceleration encountered in actual practice. But, unfortunately, it is this side of the performance area which needs most careful designation. The opposite side automatically discloses itself in practice by disorganized schedules. The side indicating maximum economy does not reveal itself in any such way, and it would be interesting to see the results of a further study of the effect (if this is real rather than only apparent) of great differences in the rate of acceleration and braking upon the location of the curve of maximum economy.

Apparently the performance area is also subject to upward and downward extension, due to variation in the factors discussed, and also to a wider range of traffic conditions, all subject of course to the capacity limitations of the equipment. The so-called area then becomes, in reality, a performance zone. It is within this zone, determined with all practical accuracy, that efficient operation, expressed in terms of speed and power consumption, must lie. As the point indicating actual operation moves from the side of the zone indicating maximum efficiency toward the opposite side, the "slack" in the schedule diminishes and economy and regularity of service decrease.

As Mr. Koehler states, the preparation of diagrams showing these zones for different types of equipment is not a very serious matter for a railway with a reasonable variety of equipment. Where car meters are in use the additional labor necessary to prepare data for the proposed schedule studies is small and the study itself should be well worth while. There should be no difficulty in determining whether or not the schedules in question show approximate approach to most economical speed under different traffic conditions even if the curve of maximum economy is not exactly located. Greater refinement of study, if justified by the volume of traffic involved, may require additional data as to number and length of stops and rates of acceleration and braking, and through these data the meter records may acquire more definite value.

Where car meters are lacking it may still be possible to make approximate schedule checks if feeders supplying equipment of uniform type and service can be suitably isolated and metered, but no such refinement of schedule adjustment can be expected in this way as from the use of individual car meters.

It is probable that the useful application of the proposed method of analysis will be limited to fairly large systems with frequent headway or high ratio of rush hour to base service. Under other circumstances the convenience to patrons of a fixed, regular headway may be of greater advantage than the power saving from periodical, confusing schedule adjustments. Terminal layovers may, however, sometimes be employed to raise schedule speeds to the most economical point during periods of light traffic.

L. R. NASH.

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## The Association's Bureau of Information

AMERICAN ELECTRIC RAILWAY ASSOCIATION.
NEW YORK, July 12, 1917.

To the Editors:

I have read with much interest the letter of Leake Carraway, director of publicity of the Southern Public Utilities Company, which appeared in your issue of July 7 and dealt with the organization, within the American Electric Railway Association, of a bureau of publicity designed to be of use to the entire industry. I agree most heartily with Mr. Carraway's ideas, although the exact form which such an organization should take should be carefully considered. For the mere purpose of disseminating information concerning company publications, it is, of course, unnecessary.

The association has always maintained a bureau of information which is constantly being improved. Most of the member companies are making extensive use of its facilities. Occasionally, however, instances come to the attention of association officers where railway officials are apparently unaware of the facilities which the association possesses for collecting and collating information, and in consequence attempt on their own behalf the gathering of information which is at the time in possession of the association and which may be secured in a much shorter time and with less trouble both to the officers desiring it and those to whom the queries are addressed.

Among these gentlemen are undoubtedly some of those who communicated with Mr. Carraway concerning the cost of and details of publication of his company magazine. At the instance of the executive committee of the Transportation and Traffic Association a questionnaire was sent to all of the member companies some time ago covering the matter in question, and the association has on file full information. This could and would be brought up to date at the instance of any member making inquiries and would have saved both Mr. Carraway and his correspondents much trouble and time.

The same thing is true along almost every line of electric railway work, and a good rule for all association members in quest of information would be to write first to the association before attempting the collecting of information independently. It might also be worth while for those receiving requests for information along general lines to refer the inquiry to the association directly.

E. B. BURRITT, Secretary.

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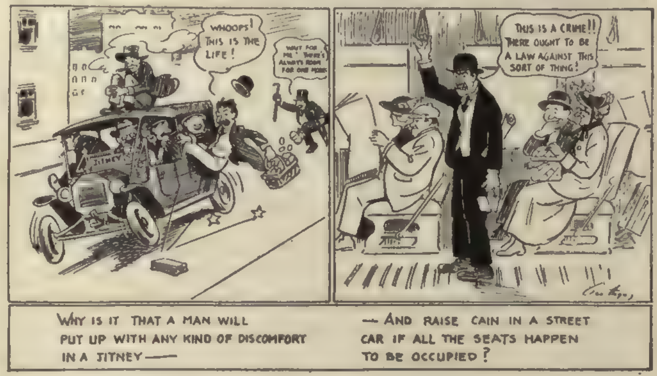
The Pacific Electric Railway, Los Angeles, Cal., is at the present time operating with 1200-volt trolley approximately 80 miles of equivalent single track, which extends from Covina Junction to San Bernardino and includes the line from San Antonio Heights to Ontario, also the Pomona Line from Lordsburg to Ganesha Junction and the San Dimas Line from Lone Hill to Quarry Canyon.

## Cartooning the Jitney

To the railways that are still confronted with jitney competition, the accompanying cartoon from *The Electrogram* of the Puget Sound Traction, Light & Power Company, Seattle, Wash., may prove suggestive.


WHOOPS! THIS IS THE LIFE!
WAIT FOR ME! THERE'S ALWAYS ROOM FOR ONE MORE
JITNEY
THIS IS A CRIME!! THERE OUGHT TO BE A LAW AGAINST THIS SORT OF THING!
WHY IS IT THAT A MAN WILL PUT UP WITH ANY KIND OF DISCOMFORT IN A JITNEY——
—— AND RAISE CAIN IN A STREET CAR IF ALL THE SEATS HAPPEN TO BE OCCUPIED?

THE PSYCHOLOGICAL EFFECT OF PARALLEL CONDITIONS IN JITNEY AND STREET CAR ACCOMMODATIONS

The man who has ridden in the jitneys is doubly attracted by such an illustration, for it agrees with his knowledge of the facts and it appeals to his sense of humor. It may set him to thinking about some unfair criticism that he has made about the street car service.

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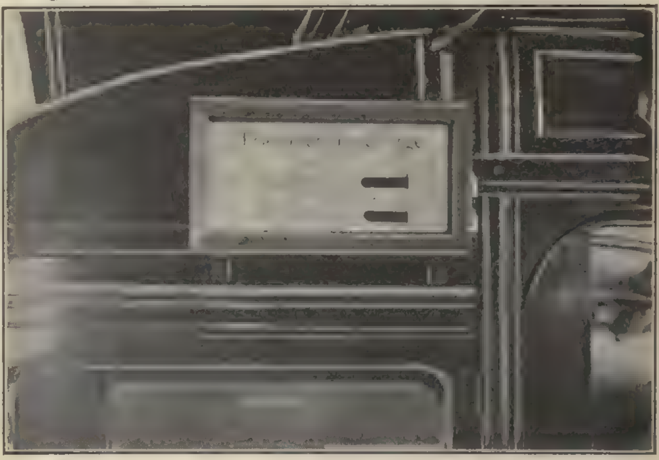
## Name Cards in Frame to Identify Trainmen

The illustration below shows a name card holder recently installed on the cars of the Seattle & Rainier Valley Railway, operating between Seattle and Renton, Wash. The names of the trainmen are printed on heavy card slips which are placed in the frame as shown. None of the trainmen is known by number, as no numbers appear on their uniforms or caps. The single word "motorman" or "conductor" is worn on the front of the cap.



FRAME MOUNTED NEAR CAR ROOF CONTAINS NAMES OF TRAINMEN IN CHARGE

The public is, therefore, required to deal with the men as individuals rather than as units of a machine, and this reacts favorably both ways, as the men feel more individual responsibility and the public feels that the one individual with whom all dealings are made is a real human being and not an automaton. It is hoped that this practice will tend to promote more favorable relations between the company and the traveling public.

# EQUIPMENT and MAINTENANCE

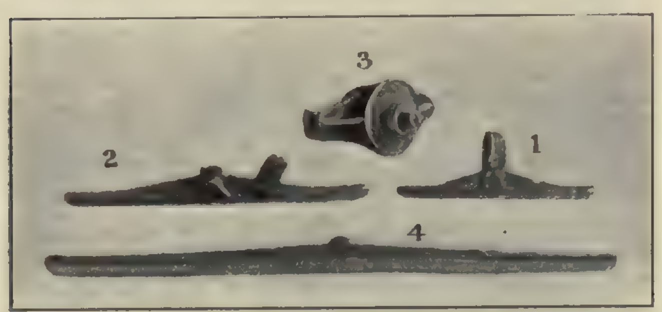
HAVE YOU A GOOD WAY
OF DOING A JOB?
*—Pass It Along*

*Read in This Issue:* **How James Scott Has Eliminated the Need of Screwdrivers and Wrenches in Overhead Maintenance Work**

## Overhead Kinks from Cleveland

### James Scott, Superintendent of Overhead Cleveland Railway, Has Devised Numerous Ingenious Means of Overcoming Trouble and Cutting Down Overhead Maintenance Costs

Ingenuity applied in the overhead department finds many improvements possible. The following kinks from Cleveland indicate what may be accomplished in the way of economies both in material and labor as the result of long experience and close observation. James Scott, superintendent of overhead Cleveland Railway, has developed new fittings which make possible the elimination of screwdrivers, wrenches, etc., and reduce the number of tools necessary for the linemen to carry and keep in repair. Another of the ideas which has been embodied in the fittings which he has developed is that overhead fittings should be cast so as to do away with machining and thereby reduce the cost.



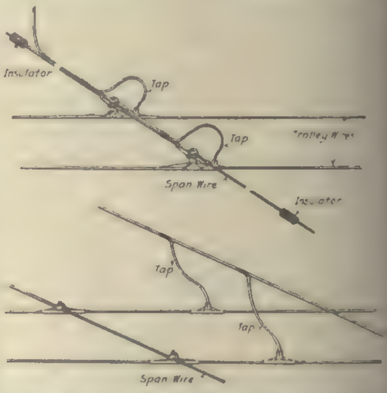
FIGS. 1 TO 4—SPECIAL HANGER AND EARS DESIGNED AND USED BY CLEVELAND RY.

### SPECIAL FEED-IN EARS

A special feed-in ear (Figs. 1 and 2) was designed to simplify some constructional details and to eliminate the defects of the ordinary yoke type of feed-in hanger. This feed ear is designed in two types, to be used one for a straight feed-in ear and the other for a combination feed-in and hanger ear. The experience of Mr. Scott has been that the ordinary yoke-type feed-in ear is gradually eaten away by the sparking which takes place between the bolt and the shell, due to a slight loosening of the screw connection after being in service for some time. In the new ear designed to take its place the feeder connection is securely and permanently made without the use of set screws or other devices by wedging the cable into a split shank, which is bored out and then divided into four sections by sawing. These four sections are then hammered together and the cable is held securely without soldering or other fastening, although solder may be used if desired. The straight feed-in ear is used at street intersections, in carhouses or at any place where it is desirable to tap the feeder cables into the trolley wire without following the span wire. This is particularly useful at street intersections where it would be impossible to follow the span wires and where the feeder can be spanned straight across the street and tapped into the trolley wire. This type of construction is illustrated in Fig. 6 and Fig. 5 shows the installation of the special combination feed-in and hanger ears.

### RECLAIMING BROKEN HANGERS

It frequently happens that a short-circuit will melt the compound out of the shell of an ordinary yoke hanger, or that the bolt will break off and render the hanger useless. Instead of throwing away the complete shell, which is usually undamaged, it is the practice in Cleveland to save the shell by putting in a new bolt fitted with a porcelain tube and holding this in place by filling the shell with ordinary cement, which makes a good insulation. One of these reclaimed hangers is shown in Fig. 3.



FIGS. 5 AND 6—ILLUSTRATING THE INSULATION OF THE TWO TYPES OF FEED-IN EARS

### EXTRA LONG EAR FOR RECLAIMING WORN TROLLEY WIRE

A special ear, which has been much used in Cleveland to prolong the life of grooved trolley wire which has become burned and weakened at the ends of the original ear, is shown in Fig. 4, and the details are given in Fig. 7. It is 24 in. long, so that it will completely span the location of the original ear. A section 6 in. long at each end of the ear is grooved in the usual way, while the central portion of the ear is cast with a groove in the side of the ear with the bottom forming the trolley wheel contact instead of the wire. Between the end and center sections there is a cut in the side to allow the trolley wire to be placed in the side groove of the center section and at the same time to be fastened into the central groove at the end section by clinching in the usual way. The grooves are cast with a ½-in. radius to take a wire 0.48 in. in diameter, or whatever size trolley wire the ear is to be used with. By this means the worn portion of the trolley wire is protected in the side groove of the ear and does not receive any further wear. The clinching of the ear at each side of this worn portion gives mechanical and electrical fastening on the unworn trolley wire at either side of the old ear location, and thus greatly strengthens and prolongs the life of the trolley wire at a point which would otherwise soon break.

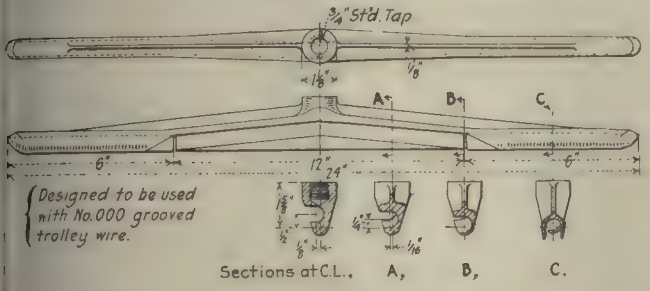

3/4" Std. Tap
1 1/8"
1/8
A
B
C
6"
12"
24"
6"
Designed to be used with No. 000 grooved trolley wire.
Sections at C.L., A, B, C.

FIG. 7.—DETAILS OF EXTRA LONG EAR FOR RECLAIMING WORN TROLLEY WIRE

### SPECIAL STRAIGHT-LINE HANGER

A special straight-line hanger which is designed to be secured to the span wire by means of a steel wedge is shown in Fig. 8. This is made of malleable iron with the steel stud surrounded by insulating material in the usual manner. The yoke is designed so that the pan wire slides into the grooves on opposite sides at the two ends. A steel wedge, 9 in. long and tapered ½ in. in 12 in., is driven in the slot provided for the urpose on top of the span wire. The bottom edge of his wedge is unfinished and as it is driven in it grips he span wire firmly. A single wedge serves for both nds of each yoke.

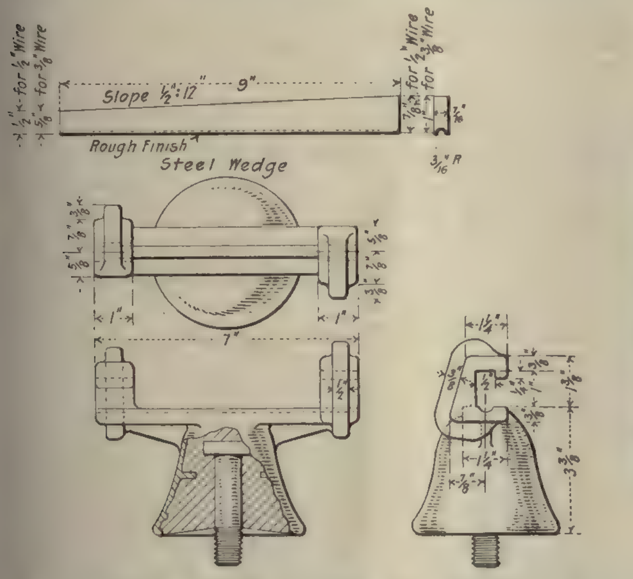


FIG. 8—HANGER SECURED TO SPAN WIRE BY MEANS OF STEEL WEDGE

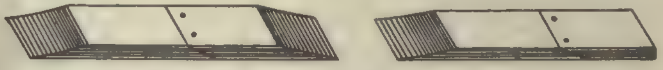
Other kinks from the line department of the Cleve-nd Railway will be given in a later issue. These clude a spring for installing hangers in trolley oughs, a glass-insert section insulator, a threadless ull-over yoke and hanger, an ear designed for accurate ignment and other practical devices.

# Using Up Short Lengths of Copper-Leaf Brushes

BY H. E. DAVIS

Electrical Engineer New York State Railways, Syracuse, N. Y.

While the use of copper-leaf brushes is being rapidly superseded by the more modern metal-graphite brush for use on slip rings of rotary converters, there are a large number of the old-style brushes still in use. When the leaves become short, considerable saving can be made by using up the short sections in the following manner: Two short brushes are beveled on the soldered ends, riveted, and then soldered together. The composite brush may be used from both ends as shown in the left-hand illustration or it may be trimmed and soldered as shown in the right-hand one. The latter method makes a neater job, and the brush may be used after being worn by removing the damaged end at the joint and splicing on another short brush.

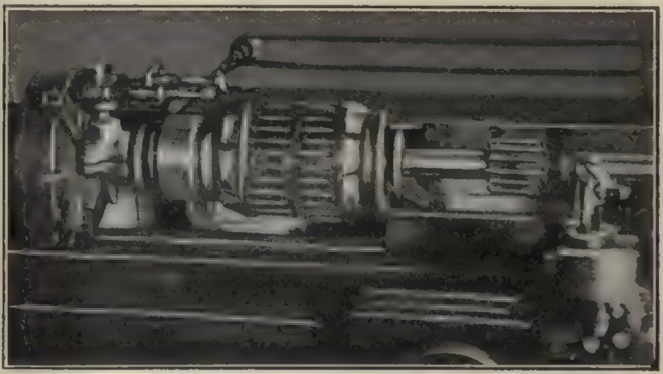


RECLAIMING SHORT LENGTHS OF COPPER-LEAF BRUSHES

# Commutator Slotter Mounted on Lathe Spindle

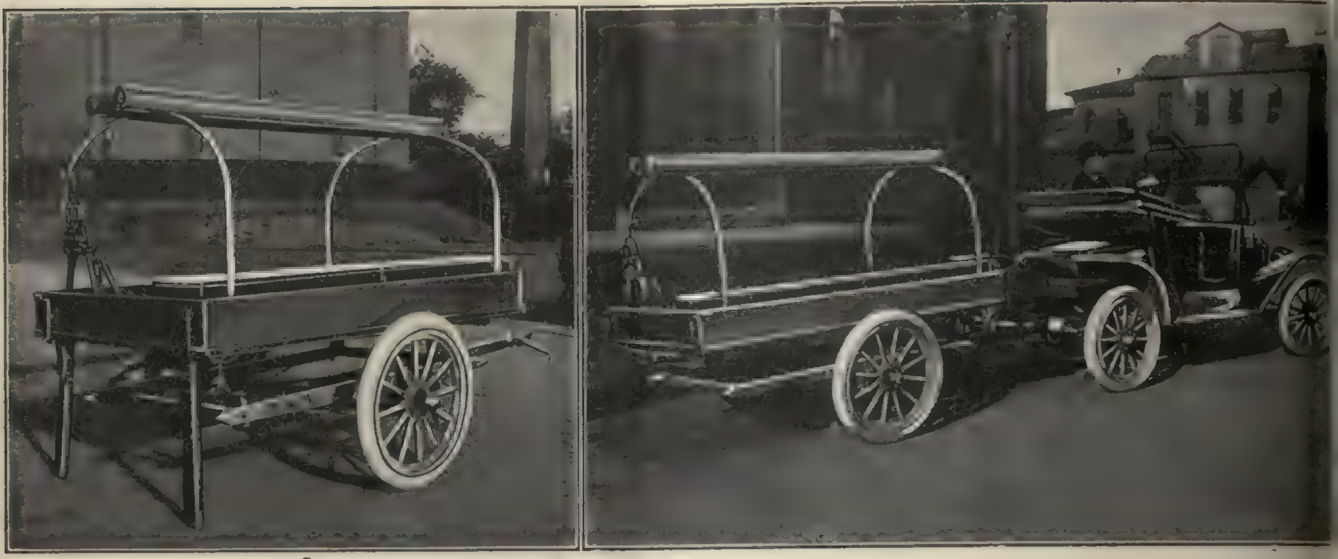
Undercutting commutators of motor armatures without removing them from the lathe after turning, is accomplished by the Wisconsin Railway, Light & Power Company, LaCrosse, Wis., by means of a special device mounted on the lathe. Any type of motor armature used by this company can be slotted with this device in a time not exceeding twenty minutes.

The device is shown in the illustration. It consists of a framework mounted on a special spindle placed in the chuck of the lathe in such a way as to bring the slotting saw always parallel with the armature axis, the armature being centered in this special spindle also. The saw-spindle bearing is cast integral with the sliding handle of the device, and as this is pushed back and forth on the two shafts supporting it, the saw travels in the slot being cut. The commutator, of course, can be rotated without rotating the framework.



SPECIAL SLOTTING DEVICE MOUNTED IN LATHE CHUCK

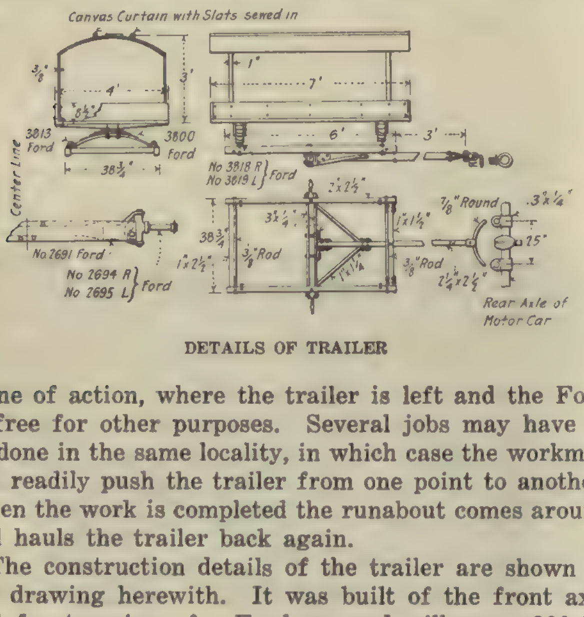
Two universal joints in the saw shaft make it possible to slide the saw back and forth without changing the position of the driving pulley, except for a slight motion parallel to the pulley axis. A ¼-hp., 110-volt, 1700 r.p.m. a.c. motor supplies the necessary power.



TRAILER STANDING ALONE AND ATTACHED TO RUNABOUT

## Trailer Increases Efficiency of Company's Runabout

By an investment of about $50 in the two-wheeled trailer shown in the accompanying illustration, the Elmira Water, Light & Railroad Company has greatly increased the service that can be rendered by its Ford runabout. In using this outfit the desired equipment is piled into the trailer and the runabout hauls it to the scene of action, where the trailer is left and the Ford is free for other purposes. Several jobs may have to be done in the same locality, in which case the workmen can readily push the trailer from one point to another. When the work is completed the runabout comes around and hauls the trailer back again.



DETAILS OF TRAILER

The construction details of the trailer are shown in the drawing herewith. It was built of the front axle and front spring of a Ford car and will carry 900 lb. on pavement. To hold the car rigid when standing two hinged props are provided on the rear of the body. A similar prop is provided in front to hold up the tongue.

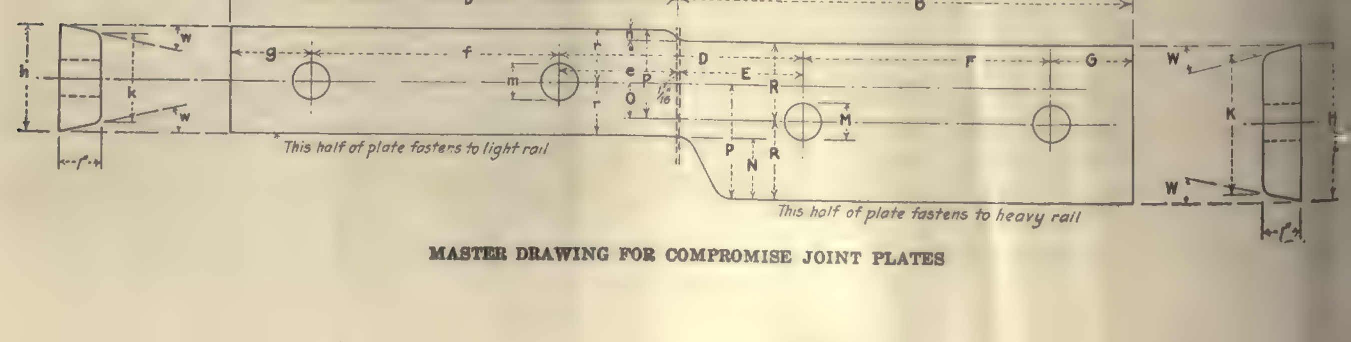
## Standard Drawing Facilitates Ordering Compromise Joint Plates

BY W. L. WHITLOCK

Office Engineer Denver Tramway Company

As the Denver Tramway is a consolidation of several smaller properties, and as these companies, in constructing their respective systems, used rails of different weights and dimensions, it follows that numerous special compromise joint plates are required to join the rails of different sections at various points on the system.

To eliminate the necessity of making up a special drawing for each combination of rails, a standard compromise joint plate drawing was made, with the various dimensions indicated by letter, as shown in the accompanying illustration. At the same time a table of dimensions to correspond with these letters was made up for all the rail-joint combinations occurring on the property. Now, when a set of plates is ordered for any location, the field man specifies the rail sections to be joined and the engineering department fills in the proper dimensions on a blue print struck off from the master tracing, on which the dimensions are left blank. This greatly simplifies the work of providing compromise joint plates, and minimizes the time required of the engineering department forces.


1"
S
U
1"
This face of plate towards web of Rail
A
b
B
h
w
k
w
r
g
f
m
r
e
p
O
r
1/16"
D
E
F
G
R
M
P
N
R
W
K
H
W
r
This half of plate fastens to light rail
This half of plate fastens to heavy rail

MASTER DRAWING FOR COMPROMISE JOINT PLATES

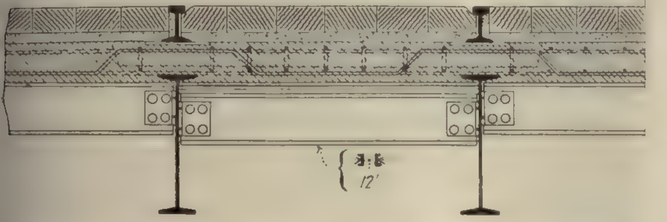
As an example of how the drawing and the table of dimensions are used, the following dimensions are for use on joints between 65-lb. and 80-lb. rails:

$A = 20$ in.
$D = 5\ 5/16$ in.
$O = 11/32$ in.
$U^2 = 1/32$ in.
$U^1 = 1/16$ in.
$b = 9\frac{7}{8}$ in.
$e = 2\frac{1}{2}$ in.
$f = 5$ in.
$g = 2\ 11/32$ in.
$h = 3$ in.
$k = 2\ 17/32$ in.
$m = 1$ in.
$n = 7/32$ in.
$p = 1\ 27/32$ in.
$r = 1\frac{1}{8}$ in.
$w = 13$ deg.
$B = 10\frac{1}{4}$ in.
$E = 2\frac{3}{4}$ in.
$F = 5$ in.
$G = 2\ 11/32$ in.
$H = 3\frac{1}{4}$ in.
$K = 2\ 13/16$ in.
$M = 1$ in.
$N = 15/32$ in.
$P = 1\ 31/32$ in.
$R = 1\frac{5}{8}$ in.
$W = 13$ deg.

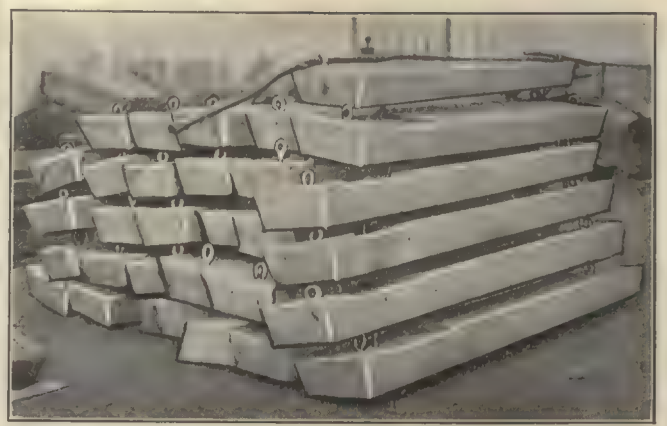
# Building Track on a Concrete Bridge Floor

### Cleveland Railway Uses Steel Ties Embedded in Concrete on Clark Avenue Viaduct, with Provision for Removal

Track built with steel ties incased in concrete has been quite generally adopted for permanent highway bridge floors. This combination of all permanent materials insures long life, especially if the precaution is taken to provide a large bearing area to transmit the track loads to the concrete and to support the joints. International steel twin ties were adopted by The Cleveland (Ohio) Railway as best suited to accomplish the desired result for the Clark Avenue viaduct in Cleveland. This structure is about 1 mile in length and a double track of the Cleveland Railway passes over it. The twin ties used were of a special design consisting of two 3-in., 4-lb. channels 6 ft., 2 in. long, which serve as anchorages and tie rods for two bearing plates 5/16 in. x 13 in. x 4 ft. 3 in. in size. These ties were spaced at 8 ft. centers and they weighed 166 lb. each.

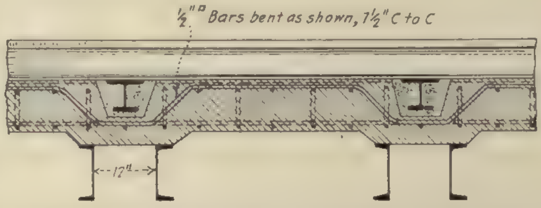


SECTION THROUGH BRIDGE FLOOR, SHOWING CONCRETE STRINGERS



SHEET METAL ENCASED FORMS FOR TIE POCKETS

The bridge floor was especially designed and built to provide for this type of track construction. As shown in the accompanying cross-sections of the bridge floor, two 9-in., 15-lb. channels placed 12 in. back to back were provided at 4 ft. ½-in. intervals as transverse stringers to carry the track loads. Over these and the bridge stringers a heavily reinforced 7½-in. concrete slab floor was laid. In order to provide an anchorage for the channels, pockets were cast in the concrete. These pockets were 6 in. wide on the bottom, 10 in. wide at the top and 6 ft. 10 in. long. The forms used for this purpose are shown in the photograph reproduced above. The entire pocket was faced with a heavy coating of asphaltum to serve as a parting in case it became necessary to remove the track and ties at any future time. Recesses ½ in. deep and 15 in. wide were also made in the bridge floor under both rails. These were provided so that the track could be raised to grade and about 1 in. of grout floated beneath the tie plates to furnish the permanent bearing. The recesses with the track in place are shown in the illustrations at the bottom of this page.



SECTION THROUGH SLAB, SHOWING TIE TROUGH

CLEVELAND BRIDGE TRACK CONSTRUCTION—RAIL ON TIE BEFORE APPLICATION OF FASTENING; FORCING RAIL UNDER ONE SET OF CLIPS; FORCING SECOND CLIP AGAINST RAIL BASE BEFORE DRIVING WEDGE

Track laying in this type of construction was a comparatively easy operation. After the ties had been laid in place and one set of clips inserted, the 100-lb. A. R. A. rail was laid and the joints secured in place by two drift pins. In this position the other set of rail clips was applied and the wedges driven into place. Four men were required to apply the clips, two to nip up the tie and two to put in the clips. After the rail base had been forced under one set of clips by driving a track chisel into the hole for the opposite clip, the latter was inserted and forced against the rail base with a hand spike. This operation was quickly done, and the track was then ready for lining and raising to the permanent surface. The method of applying the rail fastenings is shown in the accompanying illustrations. Grouting in the tie plates and riveting the Clark joints followed. The bridge wearing surface, consisting of a 2-in. sand cushion and 5-in. brick, was then laid by the paving contractor. The bridge construction, including the tie pockets was done by a contractor, and the track was laid by the railway company's track forces.

## Improving Transformer Cooling in Old Substation

BY E. H. HAGENSICK
Superintendent of Electric Lines Omaha & Council Bluffs Street Railway, Omaha, Neb.

The intake of the fans on the transformer air-blast cooling system in one of the substations of the Omaha & Council Bluffs Street Railway formerly had no outside connection. The fans were installed on the ground floor of the substation without inclosure, so that the hot air and dust in the interior of the building was circulated round and round and the cooling was naturally poor. To improve this condition without changing the setting of the fans and without any construction work on the building, a transite board partition was built in the corner of the room inclosing the fans and including two outside windows. A weatherproof housing was built outside over the windows. This housing made it possible to take in fresh air from outside and force it through the transformers, and eliminated using the same air over and over again. The expense involved was small, and while it detracts from the appearance of the substation interior, yet the cooling of the transformers and the air conditions in the substation are so much better that the scheme was worth trying.

HOUSING FOR TRANSFORMER COOLING

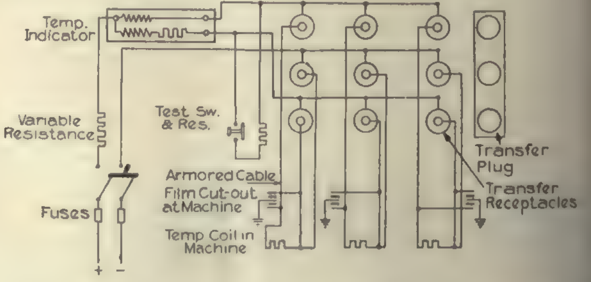
## Indicator for Internal Temperatures of A.C. Machines

The use of temperature coils in the windings of electrical machines is now general for indicating the internal temperatures of alternators and other a.c. machines of large size. The General Electric Company has developed a temperature indicator for use in connection with such coils by means of which internal temperatures can be read directly in degrees. This indicator contains two windings, one of which is connected in series with the temperature coil and the other is in series with a coil of manganin the resistance of which is constant at all temperatures and equal in value to that of the temperature coil at a given temperature. The position of the pointer in the indicator is determined by the relation of the currents in the two windings, that through the manganin coil being constant, while that through the temperature coil varies inversely with the resistance, which in turn is determined by the temperature. The accompanying electric circuit diagram shows the scheme in outline, and a photograph of the indicator switchboard is also reproduced.

TEMPERATURE INDICATOR SWITCHBOARD

The diagram shows, in addition to the indicator and connection plugs, the following essential accessories: A rheostat of variable resistance to permit compensation for variation in the test-circuit d.c. voltage which may normally be 125 or 250; a test switch and resistor to show whether the instrument is working or not; film cutouts at the machine to protect the operator by grounding the line in case the voltage rises above 400; a transfer plug and receptacles for use in shifting the indicator to one temperature coil or another.

The temperature coils are made of copper wire wound in a thin form and pressed flat so as to be non-inductive. In the machine winding they are connected by a three-conductor armored cable to a combination terminal and cutout box mounted on the machine. This box carries the terminals for attaching the leads from the coils and for the extension leads to the instrument.



CIRCUIT DIAGRAM, SHOWING CONNECTIONS OF TEMPERATURE INDICATOR AND ACCESSORIES

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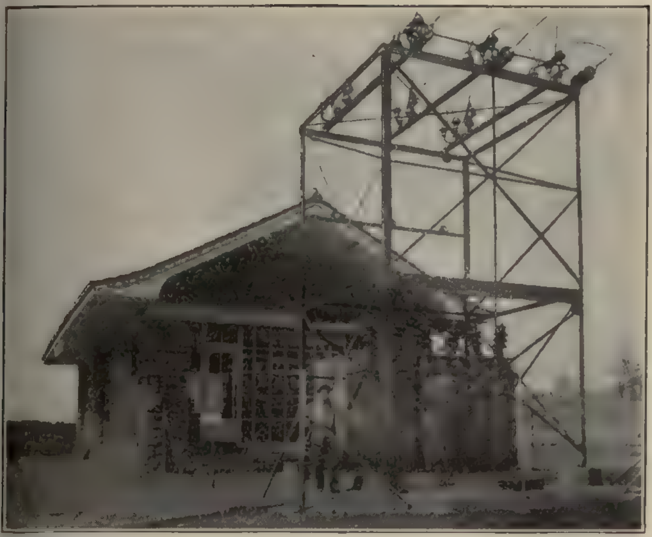
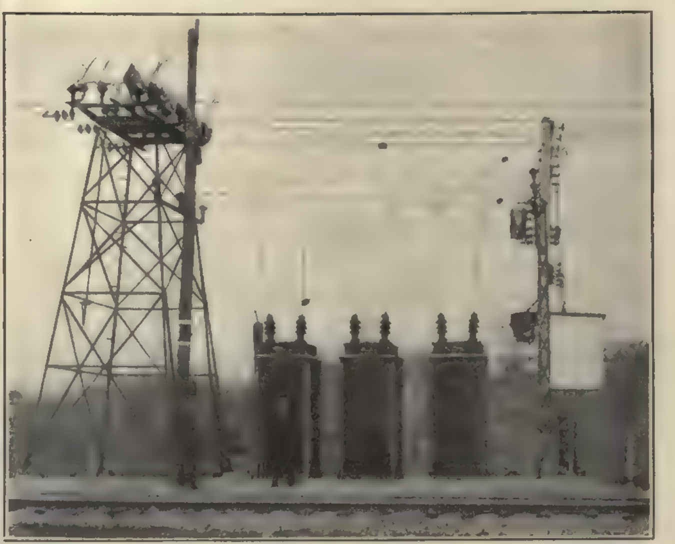
The Denver Tramway has replaced its five-light, 600-volt clusters in the downtown district by 110-volt, 100-watt and 200-watt nitrogen filled lamps. The economy effected by these lamps warranted the installation of a motor-generator set so individual lamps could be used.



SUBSTATION OF THE KANSAS CITY, KAW VALLEY & WESTERN RAILWAY AT MAHON, KAN.



TRANSFORMER AND SWITCHING EQUIPMENT AT MUNCIE SUBSTATION, K. C., K. V. & W. RY.

# Daylight-Type Substations Installed on Kansas Interurban

## Outdoor High-Tension and Switching Installation Makes Simple Substation Layout Possible

A type of substation buildings which is inexpensive, insures a maximum amount of light, and presents an attractive appearance from the architectural point of view has been utilized at three points by the Kansas City, Kaw Valley & Western Railway. These three substations, located at Mahon, Muncie and Leroy, Kan., are known as daylight substations from the utilization of glass for the entire exterior walls. They are characterized by their simplicity. This feature is due in large part to the installation of the transformers and high-tension apparatus and switching equipment outside of the substation building. In this outdoor equipment are included the Westinghouse single-phase, oil-insulated, self-cooled outdoor-type transformers with the various high and low-tension protective devices. The transformers are protected on the low tension side with automatic oil switches, and on the high-tension side by Burke combination horn-gap lightning arresters, choke coils and fuses. All of the switching protective apparatus is mounted on steel towers furnished by the Railway & Industrial Engineering Company.

The heavy corner posts and columns of these substation buildings are built of rock quarried from the company's right-of-way. They are covered over with a low, sloping, wide-overhanging roof, producing a colonial style of building of very attractive appearance. The interior is equally attractive, due largely to the simplicity of the layout, which includes simply the machine and switchboard for machine and outgoing feeders.

The substations at Mahon and Leroy each contain one 500-kw., six-phase, 60-cycle rotary converter. The substation located at Muncie, about 4 miles west of Kansas City, Kan., is also of the daylight type, but in this instance the three 185-kw., single-phase, air-blast transformers are installed inside the station. This substation is equipped with a 500-kw., six-phase, 60-cycle Westinghouse rotary converter.

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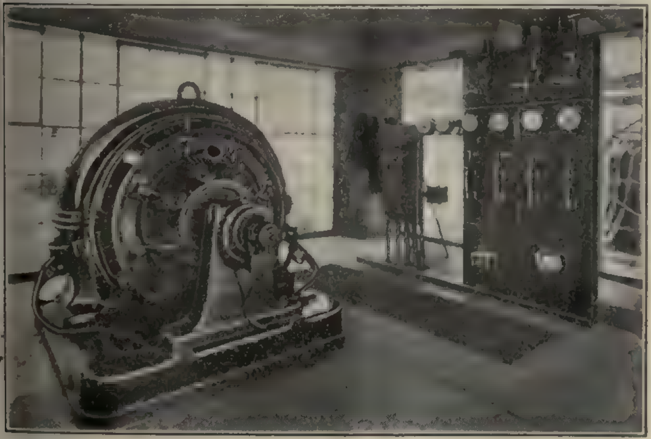
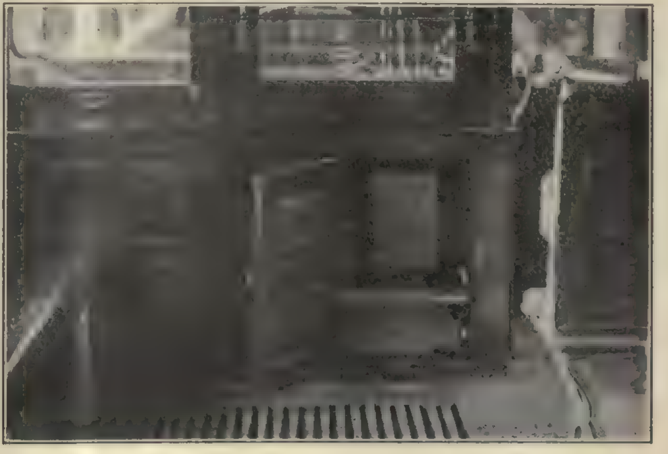
# Air Compressor Governor Located in Front Bulkhead of Car

The accompanying illustration shows an air compressor governor located in a cabinet in the front bulkhead of a car. This is the practice on the Des Moines (Iowa) City Railway, where it was desired to remove the governor from the floor in order to facilitate the washing of the car. The cabinet is provided with a swinging door which makes the governor readily accessible for the purposes of inspection and adjustment.



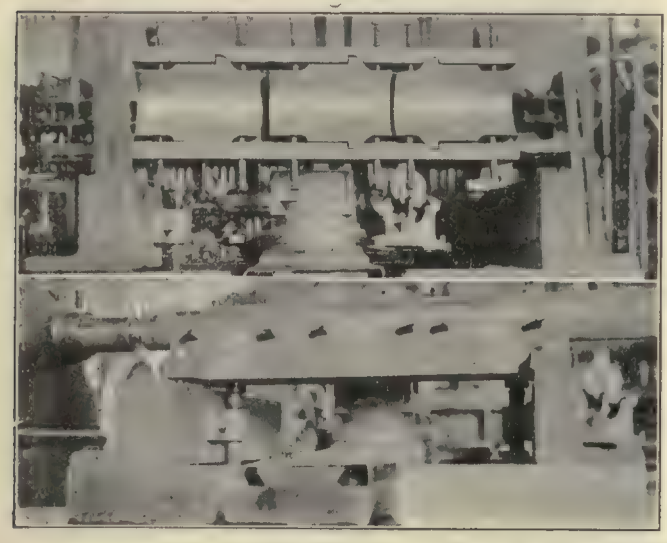
INTERIOR VIEW OF THE DAYLIGHT SUBSTATION AT MAHON, KAN.



FRONT BULKHEAD OF CAR USED FOR HOUSING AIR COMPRESSOR GOVERNOR

## Bores Three Journal Brasses at Once

The boring of three 4¼-in. journal brasses at once is accomplished by a device used in the shops of the Knoxville Railway & Light Company, Knoxville, Tenn. Bolted to the sliding carriage of the lathe are two heavy castings at right angles to the length of the lathe. As shown in the accompanying illustration, each of these castings holds a large flat-headed screw placed directly beneath the center line of the lathe. The brasses are held by a block which rests on these screws, which in turn are raised and lowered to adjust for different sizes of brasses. When the proper adjustment has been attained the block is bolted to the heavy castings as shown. The brasses themselves are held in the block by screws pointing slightly downward. With this device twenty-five 4¼-in. brasses are bored in an hour.


TWO VIEWS OF BLOCK HOLDING THREE BEARING BRASSES WHICH ARE BORED SIMULTANEOUSLY

## More About Burning Anthracite

Apropos of the article printed in the issue of the ELECTRIC RAILWAY JOURNAL for June 23, page 1454, are the following notes based on an article on the same subject printed in the *Electrical Review*, London, of June 15.

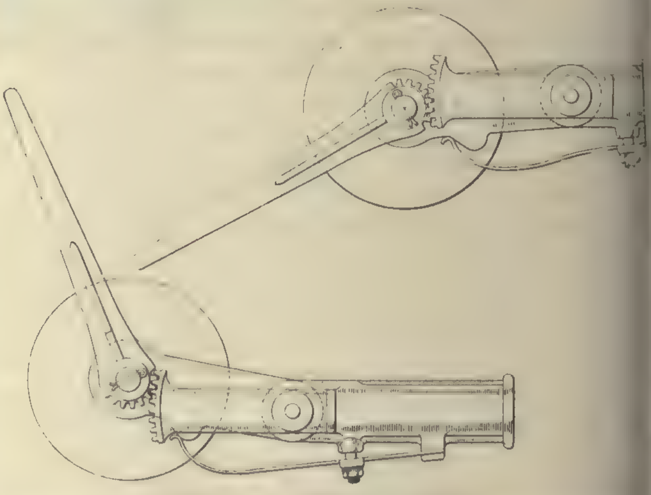
Almost all anthracite coal is solid carbon, which, when it passes through the grate, burns to carbon dioxide, $CO_2$. If the fire is thick the gas in passing through unites with more carbon, thus forming carbon monoxide, CO, which must be burned again to $CO_2$ by the addition of air above the fire. If the fire is thin enough air gets through the bars to burn all to $CO_2$. Any hydrogen present combines with the carbon in such a manner that the flame is practically within the fuel bed. As all of the heat of combustion is generated near the grate surface, it is desirable to use a better grate than with bituminous coals, and especially must the grate bars not present parts of their sides to the fire. Various methods have been adopted to prolong the life of the bars, protection by means of water and ashes being common.

Steam is now quite generally used with anthracite to sharpen the draft. By the use of steam-blow inductors air is forced into the ashpit and passes with the steam directly to the furnace. The steam on being decomposed therein helps to modify the intensity of the temperature of the grate surface. By these means anthracite coal may be burned at a higher rate than with natural draft, but greater care is necessary to preserve an even grate surface and to maintain an even thickness of fire.

## An Improved Trolley Finder

A trolley finder, which has been tried out with good results on the Ogden, Logan & Idaho Railway, is shown in the accompanying illustrations. The object of this finder is to guide the wheel back to the wire after it has jumped off on account of having struck a hard spot or similar defect.

The finder has two horns which stand in a vertical position when the trolley wheel is off. As soon as the wheel is pressed against the wire by the spring in the trolley base the horns are forced into an approximately horizontal position. A patent on this device has been obtained by Perry B. Sawyer of the B. & S. Universal Trolley Company, Ogden, Utah.


DETAILS OF TROLLEY FINDER

VIEWS OF TROLLEY FINDER IN OFF AND RUNNING POSITIONS

It is claimed that the small movement between the trolley wheel and the harp helps to take up any irregularities in the trolley wire without causing the excessive sparking which sometimes occurs with the rigid type of harp.

# News of Electric Railways

Traffic and Transportation
Financial and Corporate Personal Mention Construction News

## Agreement in St. Louis

### Settlement of Differences Between United Railways and City Proposed on Valuation of $60,000,000 for Railway and Division of Net Earnings on 50-50 Per Cent Basis

At the meeting of the representatives of the city of St. Louis, Mo., and of the United Railways on July 6 an ordinance drafted by City Counselor Daues was submitted. The measure contains sixty-four sections and embodies the principles of the so-called skeleton plan for the settlement of the differences referred to previously in the ELECTRIC RAILWAY JOURNAL.

#### TERMS OF DRAFT PRESENTED JULY 6

According to the draft presented by Mr. Daues on July 6, the value placed by the city on the property of the company was $60,000,000. On this the company was to be permitted to earn 6 per cent. The city was to be taken in as a partner in the profits and was to share in the net earnings on the basis of 60 per cent to the city and 40 per cent to the company after 6 per cent on the valuation of $60,000,000 had been set aside. The representatives of the company were willing to proceed at once with the negotiations of the minor details, but wanted the questions of valuation, earnings return and the division of profits to be considered later. The Mayor contended that unless the company and the city could agree on the valuation and the division of profits it would be useless to continue the negotiations. The matter was then put over until the night of July 9. The $60,000,000 fixed by the city as the value for the property would mean a reduction of $40,000,000 in the total capital liabilities of the company. It was said unofficially that the representatives of the company were willing to consider $70,000,000 as the proposed valuation with an allowance of 6 per cent on this amount and then a division of the net profits on the basis of 50 per cent to the city and 50 per cent to the company.

#### TERMS AGREED UPON ON JULY 9

With matters standing as just related there were misgivings about the final outcome. At the meeting on July 9, however, agreement was reached on the questions at issue by concessions on the part of both parties to the negotiations, and as a result Counselor Daues was instructed to complete the draft of the ordinance with the revisions and submit it to the Board of Public Service so that it could go to the Aldermen on July 13. The essential points in the agreement as it stood after the conference on July 9 were:

Capital stock fixed at $60,000,000, with interest at 6 per cent, with new capital, if there should be any authorized, at 1 per cent over the rate of interest of the new issue.

Division of surplus, after the interest has been paid, on the basis of 50 per cent to the city and 50 per cent to company.

The city to have four of the board of directors of thirteen members, with the Mayor, comptroller, president of the Board of Aldermen and director of public welfare as the four.

One member of the board of control, the operating board of the system, to be selected by the company, one by the city, the third by these two; in event of failure to agree the third to be selected by the St. Louis Court of Appeals.

Payment of the accumulated mill tax, including the portion accruing while operation of the system was under the St. Louis Transit Company, estimated at $2,300,000, to the city upon acceptance of the new franchise, the mill and all occupational tax ordinances to be thereupon repealed.

Franchise for all lines to be uniform and for fifty years from the date of the signing of the ordinance by the Mayor.

Purchase option on the system to the city after the first ten years, or at the expiration of any five-year period thereafter.

Fares to stand at not to exceed 5 cents for adults, 2½ cents for children from five to twelve years of age and transfers for a trip in any one general direction.

The company has nine months after the Mayor signs the bill to accept the measure.

It is expected that active work will be begun at once to bring the various classes of securities holders together with the end in view of having them agree among themselves as to the terms of the financial readjustment necessary to scale down the capitalization to the $60,000,000 agreed upon.

The organization of two committees to represent the holders of the general mortgage 4 per cent bonds of the company is referred to elsewhere in this issue.

## Hearing on Cleveland Terminal

### Underground Terminal Suggested for the Public Square—Cost, with Approaches, Placed at $15,000,000 to $20,000,000

A hearing on the plan of Mayor Harry L. Davis for an underground street railway terminal at the Public Square, Cleveland, Ohio, took place before the street railway committee of the Cleveland City Council on June 28. During the discussion J. J. Stanley, president of the Cleveland Railway, told the committee that under a new franchise, other than the Tayler plan, which would produce earnings of 6 per cent or more, the company would undertake the construction of a terminal to cost $15,000,000 or $20,000,000, but if the city built the terminal and the company continued to operate under its present franchise, he felt that no rental should be charged for its use. He said that any rental paid would come out of the pockets of company's patrons and would not affect the stockholders in any way. He further suggested that the first subway should be in Ontario Street, instead of Superior Avenue, as suggested by the Mayor. F. F. Prentiss, chairman of the city planning commission, argued that a street railway commission should be appointed at once, as suggested by the Mayor, and that the start on improvements should be made now, since the city already has a population of almost 1,000,000.

The street railway committee of the City Council of Cleveland did not report on the ordinance of Mayor Davis establishing a street railway commission at the regular meeting on July 9. A motion to take the ordinance from the committee failed. In order to satisfy certain members of Council, Mayor Davis had already announced the names of the men he would appoint as members of the commission if the ordinance was passed. His selections were as follows: Charles A. Otis, Charles E. Adams, O. P. Van Sweringen, M. A. Bradley and Street Railway Commissioner Fielder Sanders, all men of affairs.

The public utilities committee of the Chamber of Commerce reported on July 6, in favor of the subway.

The Builders' Exchange had also approved the ordinance. Councilman Dittrick was one of the open opponents of the appointment of a commission to superintend the construction of a subway terminal. He argued that it would be preferable to have the construction work done under the management of city officials. Councilman A. J. Damm has prepared a resolution providing for the purchase of the street railway property, which he will submit to Council at a future meeting. This would provide that the question be placed before the voters at the fall election, together with the question of a bond issue for the payment of the municipal debt thus incurred.

## City Official on Transit Contracts

### Comptroller Prendergast of New York City Reviews Conditions of Contract with Brooklyn Rapid Transit Company

William A. Prendergast, comptroller of the city of New York, has contributed the leading article to the July issue of the *B. R. T. Monthly*, published by the Brooklyn Rapid Transit Company. He deals with the city's interest in the contract with the New York Municipal Railway Corporation, under which corporation the rapid-transit lines of the Brooklyn Rapid Transit Company will be operated. Mr. Prendergast says in part:

"The absolute necessity of dividing the financial burden of the extension of our transit facilities between the city and the railroad was a compelling motive in the execution of the existing contract, but it was not the only reason. Both the city and the railroad possessed certain properties susceptible of transit use, but entirely disconnected. To tie these properties together and to extend them so as to increase the opportunities for quick and convenient travel was the second and equally important reason for the making of the contract.

"For these financial and physical reasons the city and the Brooklyn Rapid Transit Company became partners. This partnership was a matter of gradual development. Men in private business come to quick decisions on important suggestions, but municipalities move slowly, especially when the question is one of relationship with a railroad corporation. There are public officials who have a cowardly reluctance to making agreements between the city and a railroad company because they prefer to pander to that element of the community which believes a railroad is always wrong. This characteristic hinders progress and comfort in travel and the handling and exchange of commodities.

"There is an utterly foolish theory that it does not matter what burden you impose upon a railroad corporation. No institution of whatever character can be burdened to excess without this burden reflecting itself in impaired service. When the city itself is forced to take on new financial obligations, it invariably finds it has to restrict itself in other directions. So with the railroad, whether it be the one we are discussing or any other—it will be forced to curtail its service in proportion to the excessive obligations it has to meet.

"This contract suggests the following relationship: The city as financial partner and supervisor, the company as financial partner and operator. The relationship is founded upon absolutely sound principles, illustrating the wisdom of municipal ownership unhampered by the futility of municipal operation. When we speak of the city investing its money, it is the collective funds of its citizenry that are meant. Consequently every citizen has an interest in this contract. It is his business to use his efforts and influence to make it a success. The failure of the enterprise would mean a greater tax rate. Its success means a lightening of the tax burden."

## Court Asked to Sustain Car Order

A writ of certiorari has been obtained from the Supreme Court for a review of an order made by the Public Service Commission of the First District of New York on Feb. 8, directing the Brooklyn (N. Y.) Rapid Transit Company to add 250 new cars to its surface railway equipment. An affidavit made by Commissioner Whitney said that in numerous hearings the fact was disclosed that on the principal lines there was excessive loading during the rush hours, and in some cases the seating capacity was exceeded by more than 100 per cent. Mr. Whitney told of a conference in his office on Dec. 18, 1916, when President Williams of the Brooklyn Rapid Transit Company admitted that more surface cars were necessary, that the company had been considering buying more, and had been deterred from doing so by the high prices due to the war. Mr. Whitney said that counsel for the company asked for more time, "so that they would have latitude to take advantage of any favorable fluctuation in market prices." In his affidavit Mr. Whitney said:

"I respectfully submit that the writ of certiorari sued out was not obtained in good faith to review the commission's determination, but solely for the purpose of delaying compliance with the order and of making improvements in the service which, in the commission's opinion, should have been accomplished long ago. The delay incident to a hearing upon the writ will, in my opinion, seriously affect the public interest, because the determination upon the hearing can hardly be made before the period fixed for providing the first installment of additional cars."

Mr. Whitney asks the Court to quash the writ. Argument was heard in the Supreme Court on July 12.

## Vancouver Strike Aftermath

### Professor Shortt to Investigate Transportation Problem of Greater Vancouver

As a result of the strike of some 1260 of the employees of the British Columbia Electric Railway, Vancouver, B. C., the whole transportation problem of Greater Vancouver is about to be investigated by Prof. Adam Shortt, one of the leading authorities on political economy in Canada.

The company has granted the men their demands for increased wages, amounting to approximately 5 cents an hour after the first six months, and has resumed operation of its city and interurban systems provisional on the whole question being investigated by a commissioner and the adoption of his recommendation by the Council of Vancouver.

The employees ceased work in Vancouver on June 13 and in Victoria on June 14 and resumed operation on the afternoon of June 21. The strike was characterized by a total absence of violence and it took the form of a three-cornered fight, in which the jitney and other factors in the transportation problem played a part.

The company offered its men a series of war bonuses amounting to $100,000 a year and stated that it was impossible to pay any further increases, especially in view of the curtailment of its revenue by jitney competition.

The first efforts of the company took the form of educating public opinion through the newspapers toward the realization that it had made the men the largest offer circumstances would allow and that while confronted with jitney competition it would be impossible to grant the men any increases above the war bonuses that were proposed.

#### Merchants Make Suggestions

The City Council of Vancouver, which in times past had declined to accede to the company's request for adequate regulation of the jitney traffic and showed its antagonism to the company recently in a fight for charter amendments giving itself power to enter into competition with the company in the light and power business, took no action for the first few days of the strike. The Mayor said, when the strike began, that the time was not ripe for civic intervention. The merchants of the city took action on the third day of the strike and appointed a committee to draw up a resolution, which was afterward presented to the City Council, recommending the placing of jitneys on the non-car line streets and the cancellation of all jitney licenses at the end of the year.

The company impressed upon the members of the City Council and upon the Provincial Minister of Labor, who took a part in the efforts toward a settlement, the impossibility of granting the men's demands and resuming car service while the jitney took revenue from the company. The City Council asked that proof be furnished of this statement and the company agreed to submit the whole transportation problem to an impartial expert with a view of placing it on a sound financial basis. The City Council agreed, by a resolution, to stand by whatever recommendations the commission should make.

Owing to the necessity of a quick settlement imposed upon the company by its arrangement with the City Council, it was impossible to arrive at any better settlement with the men than the basis of their revised demands to the company, and thirty-six hours after the passing of the resolution by the City Council the men resumed work on this basis.

Professor Shortt was expected to arrive in Vancouver about July 10.

## Riots in Bloomington

### Recent Injunction Ignored by Sympathizers with Strikers—Compromise Agreement Reached

Incited to riot by "Mother Jones," who had been imported to make an address in connection with the recent strike of a few employees of the Bloomington & Normal Railway & Light Company, Bloomington, Ill., sympathizers of the strikers, in violation of the court injunction referred to in the ELECTRIC RAILWAY JOURNAL of June 23, attacked the cars, power house and offices of the company on the evening of July 5. Rioting continued throughout the night. The police were powerless to such an extent that Mayor Jones appealed for aid and state troops were sent into the city from Chicago and Peoria early the next day.

On the afternoon of July 6, 1000 employees of the shops of the Chicago & Alton Railway, in sympathy with the strikers, marched the streets of the city to the City Hall and demanded of the city officials that the company be obliged to recognize the union and establish the closed shop. The men who participated in this demonstration threatened repeated riots if their demands were refused. Upon request of the Mayor by telephone H. E. Chubbuck, vice-president executive of the Illinois Traction System, Peoria, by which the Bloomington property is controlled, agreed to reinstate the striking carmen pending a conference on July 9.

At this conference concessions were made by both sides and a compromise agreement was reached as follows: Company recognizes union. City lines to operate on open shop. Employees free to join the union if they desire, but are not to be intimidated. Faithful employees continued in positions. Striking carmen to be reinstated. Rate of pay to be: Less than one year, $2.35 a day; after one year, $2.55 a day; after three years, $2.65 a day; after five years, $2.75 a day. These rates are to continue in effect until July 1, 1918.

The troops were released on the morning following the final agreement.

Mr. Chubbuck in a statement said:

"Our general superintendent at Bloomington, D. W. Snyder, took a stand in no way opposed to organized labor as such. The majority of his men from the beginning were opposed to being forced into the union and his position was that of supporting employees whose subsequent loyalty under adverse conditions proved the genuineness of their convictions. The entire question passed from the stage of being a matter of company policy to one of public policy. When the Mayor showed me the liability of serious disturbance to the business and civic life of the community I was glad to place myself in the hands of the business interests of Bloomington and without relinquishing the principle upon which Mr. Snyder stood, do everything possible to bring about a settlement to the best interest of the city as a whole. Another question. The country is at war and in times like these it is one's duty to do all in his power to avoid a disturbance that in any way might add to the spirit of unrest which unfortunately seems to be cropping out in various places in the country."

## Change in Seattle Elevated Plans

Oliver T. Erickson, councilman of Seattle, Wash., has bandoned his idea of a steel elevated on Washington Street rom Fourth Avenue south to Railroad Avenue, and a wooden elevated railway on Railroad Avenue, Watcom Aveue and Spokane Street to the West Waterway. His new lan calls for the construction of an elevated line on Washngton Street, from First Avenue south to Railroad Avenue, nd on Railroad Avenue and Whatcom Avenue and Spokane treet, of wood, and the utilization of common-user rights n the surface track on Washington Street, between Fourth and First Avenues South. A. H. Dimock, city engineer, estimated the cost of the initial plan at $862.000, aside from he damages awarded to property owners on both sides of he street named. Unofficially, it is reported, the second lan will cost much less. The building code requires steel onstruction on that portion of Washington Street and Raiload Avenue north of Railroad Way. Whether the plan is to use steel for this portion or wood in violation of the building code has not been announced.

The Seattle & Rainier Valley Railway Company has a franchise on Washington Street, Seattle, from Fourth Avenue south to Railroad Avenue, over which cars have not been operated by the company for a number of years. Mr. Erickson's plan is to acquire common-user rights on this particular track, so that the city will be required to pay rental to that company for the use of tracks on Stewart Street, from Third to Fourth Avenue, on Fourth Avenue, from Stewart to Washington Street, and on Washington Street, from Fourth Avenue to Railroad Avenue. Under the terms of an agreement between the city of Seattle and the Seattle & Rainier Valley Railway, entered into a few months ago, the rental for these tracks would amount to between $1,500 and $2,000 a month.

## Universal Transfer Offer in Frisco

### Municipal and Private Systems Would Be, in Effect, Consolidated—Further Four-Tracking of Market Street Avoided—Private Company Cars Through Tunnel

Jesse W. Lilienthal, president of the United Railroads, San Francisco, Cal., on July 2 submitted to the Board of Supervisors of San Francisco a proposition stated as follows:

"In view of the early completion of the Twin Peaks Tunnel and the necessity of providing for immediate use of the improved facilities thus made available and realizing the great importance and benefit to the citizens of San Francisco of a unified system of transportation, we submit for your consideration a plan of operation which will obviate the necessity of duplicating transportation facilities on Market Street. We propose that the city and the company agree as follows:

"1. That the company rearrange such part of the present Parkside lines as may be necessary to furnish the best service to the Sunset district, and make connections from these lines to the tunnel tracks.

"2. That the company pay the city on a mileage basis for the use of the city's tracks through the tunnel.

"3. That there be established between the city and the company a universal exchange of transfers at all connecting points, so that a unified system of transportation may be furnished.

"4. That the city agree that no further tracks be built on Market Street and that the city will operate its cars over Market Street as at present, except for that portion of Market Street from Church Street to Van Ness Avenue forming part of the Church Street line.

"5. That should an agreement be entered into on the above basis, such agreement to be subject to cancellation by either party upon six months' notice; with the further proviso that, should the agreement be canceled by the city, then the city to reimburse the company for the cost of the reconstruction of its Parkside lines that may be agreed upon, as well as for the cost of making connections of the tunnel tracks with the existing tracks of the company."

### MERCHANTS OPPOSE FOUR TRACKS IN MARKET STREET

Great interest has been shown in this matter by the downtown merchants of the city, most of whom are opposed to the four-tracking of Market Street on the ground that such action would make that thoroughfare unsafe and unpopular. Residents of the Parkside district beyond the tunnel are also taking an active interest in improving transportation facilities there. The United Railroads' plan is received with favor by both these factions because it involves the construction of a line connecting the Parkside district with lower Market Street by through cars operating over the tracks which have already been laid on Market Street.

No final action on this proposition has as yet been taken by the city, but city officials state that the universal transfer proposal is considered as an important concession and that it is receiving careful consideration.

## Labor Editorial in Cars

The Third Avenue Railway, New York, N. Y., has reprinted and posted in its cars the editorial "Can't Keep Away," from the New York *Herald* of July 3. The *Herald* said:

"New York City, a Klondike for labor agitators, again is favored by the presence of William D. Fitzgerald, who achieved notable distinction as the organizer of the worst strike fizzle in local annals. It was last year that Mr. Fitzgerald and his attendants came to this city, bringing suffering to the men employed by the local transit companies and inconvenience to the traveling public. This declaration, emanating from the legal adviser of Mr. Fitzgerald, is interesting:

"'The action of the Third Avenue Company in posting an increase in wages is a contemptible effort to influence the men against joining the organization.'

"In other words, favorable treatment of its employees by a corporation which is not brought about through the blackjack methods of a strike is distinctly painful to the labor agitators, who see their vocation imperiled. There is a reasonable amount of belief that the transit employees of New York are quite satisfied with the conditions obtaining between themselves and their employers."

## $1,500,000 Work on City Railway

### Seattle Utilities Committee Prepares Three Bills for Improvements to Municipal Railway

At the instigation of Oliver T. Erickson, chairman of the utilities committee of the Council of Seattle, Wash., three bills have been prepared by the Corporation Counsel providing for the improvement of the Seattle Municipal Railway as follows: The extension of the system at a cost in excess of $1,500,000; the starting of proceedings to acquire the right to establish and maintain an elevated railway on Washington Street, Railroad and Whatcom Avenues, and Spokane Street; the building of a four-block line from the north end of the Ballard Bridge to the intersection of Market Street and Twentieth Avenue N. W.; the purchase of sixteen one-truck or one-man cars and four double-truck cars similar to the ones now in use on Division A. The bill for the new cars has already been introduced in the Council. The others will come before the Council at an early date.

The ordinance providing for the extension of Division A of the municipal line into Ballard proposes, at the option of the city, to pay for this extension "solely out of the earnings of the municipal street railway of the city of Seattle," although the municipal line is losing money at the rate of more than $3,000 a month. Another ordinance would authorize and direct the Board of Public Works to prepare plans and specifications for the construction of a double-track municipal railway beginning at the north end of the bridge, across Salmon Bay Waterway at Fifteenth Avenue N. W., along Fifteenth Avenue N. W. to the intersection with Leary Avenue, on Leary Avenue to the intersection with Market Street. The Board of Works is further directed to call for bids and let a contract for the construction of this extension. A third ordinance declares the intention of the city to extend Division A over Fourth Avenue, by virtue of common user agreement with the Seattle & Rainier Valley Railway, and sets forth that this will require the purchase of additional cars. The ordinance then recites that the $800,000 street railway bond issue has not all been spent, and that what remains of the bond issue is "more than sufficient to pay for additional equipment." A. H. Dimock, city engineer, estimates the cost of the proposed extensions at $920,000, to which must be added such an amount as will represent court awards to property owners. These extensions will place the city in a position to compete with the Puget Sound Traction, Light & Power Company for the 24,000 persons employed in the various industrial plants in the Harbor Island District.

Councilman R. H. Thomson, not satisfied with the report of Superintendent Valentine on possible earnings of the car lines if extended into Ballard and to West Waterway, for the reason that it did not show the increased cost of operation, advised the city utilities committee that he would ask Superintendent Valentine for a supplemental report, if Chairman Erickson did not do so. The question of whether the two disconnected city car lines could be made to pay by extensions was raised over Councilman's Erickson's bill authorizing the Board of Public Works to buy four two-truck cars similar to those now used on the city lines, and sixteen cars of the one-man type, in anticipation of these extensions. Councilman Thompson pointed out that the city has seven large cars that have never been out of the carhouse, out of a total of twelve cars bought about four years ago. Councilman Thompson questioned the advisability of building car lines until a report was submitted that would show some chance of the lines paying operating expenses.

## Strike in Toronto

The employees of the Toronto (Ont.) Railway went on strike at midnight on Tuesday, July 10. As a result there was a complete stoppage of all cars in the city on July 11, with the exception of those on the municipal lines on St. Clair, Danforth and Gerrard Streets. The civic lines could not begin to handle the crowds, however, and automobiles, vans, trucks and other vehicles choked the streets in the business district. More than 1600 trainmen are said to be involved in the strike.

Negotiations between the employees and management of the company over an increase in wages and other conditions have been in progress since April. The situation reached an acute stage during the week ended July 7, on which day at a midnight mass meeting of the men it was decided to carry an ultimatum to the company giving the management until midnight of Tuesday, June 10, to agree to the demands of the men as presented by the committee, or submit to a general strike.

Two years before the war began motormen and conductors were paid 23½, 25½, 27½ cents an hour—the first figure for the first six months, the second for the second six months, and the third for the second year and after.

In January, 1917, an advance on these figures to 26, 28 and 30 cents an hour was put in force.

The motormen and conductors now demand that they be paid 36, 38 and 40 cents an hour. The company offered 28, 30 and 32 cents an hour and a proportionate increase of 2 cents an hour over the old scale for all other employees.

R. J. Fleming, general manager of the company, states that the demands of the men would mean an increased cost of $600,000. The proposed voluntary increase offered by the company would increase the charge for wages more than $200,000.

## City Commission Rights Defined

The Court of Appeals at Cincinnati, Ohio, handed down a decision on July 9 to the effect that the Cincinnati Rapid Transit Commission has no authority to employ special counsel, as this would be in the nature of usurpation of the powers and functions of the City Solicitor. The office of counsel, occupied by former Mayor Speigel, is thus nullified. The same court held that the commission may employ City Engineer Frank S. Krug as engineer of the commission, but that he can receive no salary for his work other than that paid him by the city as one of its officials. Clerks, engineers and other employees may be employed by the commission without the necessity of seeking the consent of the City Council, it is held.

Judge Francis M. Hamilton dissented from the opinion, which, he said, seemed to be based on the assumption that the Rapid Transit Commission had abused its discretion and misappropriated funds under its contract. He said he did not believe it within the power of the court to substitute its judgment for that of the Rapid Transit Commission. If the court was to pass upon everything the commission did it would seem that the court itself would become largely the Rapid Transit Commission. Aside from these things he expressed the opinion that under the law the employment of counsel and engineer was clearly within the rights of the commission.

The decision was rendered in a suit brought against the commission by John C. Rogers, a taxpayer.

## Wages Advanced in Philadelphia

The co-operative committee of the Philadelphia (Pa.) Rapid Transit Company, at a meeting held on July 9, determined in company with the management that the condition of the 22 per cent fund was now such as to make possible from July 8 an advance of 2 cents an hour to all conductors and motormen so that the pay in cents per hour will then be based upon the following scale:

| New Men | After One Year's Service | After Two Years' Service | After Three Years' Service | After Four Years' Service | After Five Years' Service |
|---|---|---|---|---|---|
| *Surface Motormen and Conductors* | | | | | |
| 30 | 31 | 32 | 33 | 34 | 35 |
| *Elevated—Subway* | | | | | |
| *Conductors* | | | | | |
| 30 | 31 | 32 | 33 | 34 | 35 |
| *Elevated Guards* | | | | | |
| 30 | 31 | 32 | 33 | 33 | 33 |
| *Motormen* | | | | | |
| 33 | 34 | 35 | 36 | 37 | 38 |

## Power Men Out Two Hours

Several of the employees of the power house of the Kanas City (Mo.) Railways quit work Saturday evening, July 7, causing suspension of electric railway service on most lines, and interrupting illumination served from this power station. The "strike" was a result of misunderstanding. The men declared to officials that they had assumed that certain comparatively trivial matters of controversy were being disregarded. They returned to work later in the evening, and on Monday, July 9, entered a conference at the company's headquarters, with President P. J. Kealy and other officials of the company. The men requested Colonel Kealy to come down yourself and look into our complaints," and promised to abide by his decision. Colonel Kealy promised to do so, and the men expressed themselves as satisfied.

The cessation of service on the several lines, at a busy evening hour, caused a rushing business for jitneys and taxicabs. Apparently all but the dozen jitney owners raised their prices suddenly in the emergency, some charging as much as 50 cents for service for which they formerly got only 5 cents.

## Increase in Wages in New York

Conductors and motormen in the employ of the New York (N. Y.) Railways were advised on July 3 that as a result of conference between representatives of the brotherhood of New York Railways employees and the management of the company on June 21, and on several previous dates, the following increases in the schedule of wages to be paid platform men would be effective from July 1:

ELECTRIC LINES

| Conductors and Motormen | Old Rate 10-Hour Day | New Rate 10-Hour Day | Conductors and Motormen | Old Rate 10-Hour Day | New Rate 10-Hour Day |
|---|---|---|---|---|---|
| First year ...... | $2.60 | $2.70 | Ninth year ..... | $3.20 | $3.20 |
| Second year .... | 2.90 | 3.00 | Tenth year ..... | 3.20 | 3.20 |
| Third year ..... | 2.90 | 3.10 | Eleventh year .. | 3.30 | 3.30 |
| Fourth year .... | 2.90 | 3.10 | Twelfth year ... | 3.30 | 3.30 |
| Fifth year ..... | 3.10 | 3.10 | Thirteenth year.. | 3.30 | 3.30 |
| Sixth year ...... | 3.10 | 3.20 | Fourteenth year. | 3.30 | 3.30 |
| Seventh year ... | 3.20 | 3.20 | Fifteenth year.. | 3.30 | 3.30 |
| Eighth year .... | 3.20 | 3.20 | Sixteenth year and thereafter | 3.40 | 3.40 |

STORAGE-BATTERY LINES

| Conductors and Motormen | Old Rate 10-Hour Day | New Rate 10-Hour Day |
|---|---|---|
| First year .............................. | $2.60 | $2.70 |
| Second year ............................ | 2.70 | 2.90 |
| Third year to fifteenth year inclusive... | 2.80 | 3.00 |
| Sixteenth year and thereafter........... | 2.80 | 3.20 |

All conductors and motormen who were in the service of the company on Sept. 6, 1916, and have remained continuously in the employ of the company since that date, have been credited with two years' service so far as their rates of pay are concerned, commencing July 1.

It was further announced that all conductors and motormen who on June 30 were in the employ of the company and were in the employ of the company on Sept. 6, 1916, but who temporarily left the service would, commencing July 1, be entitled to their seniority in so far as their rate of pay is concerned, without regard to their temporary absence from the service.

## Toledo Conferences Resumed

Henry L. Doherty, chairman of the board of the Toledo Railways & Light Company, Toledo, Ohio, held a three-hour conference with the street railway commission in that city on July 2. Discussion of the forfeiture clause in the proposed community plan was the main feature of the conference. It was urged in its present form by Johnson Thurston, president of the commission, but Mr. Doherty declined to accept it on the ground that it would give the city the right to confiscate the property. Ralph Emery, attorney for the commission, stated that the clause could be improved in form.

Mr. Doherty was compelled to return to New York, and it was arranged for Frank R. Coates, president of the company, to present data relative to fares, paving and track building at a meeting on July 3. Mr. Thurston had insisted that the company should pave a certain distance on the outside of the tracks, but Mr. Doherty expressed a willingness to pave between the tracks only. The point was left undecided to be taken up again after data have been furnished.

At a meeting held on July 3 the Street Railway Commission of Toledo, Ohio, decided to remodel several clauses of the community plan franchise to which Henry L. Doherty objected. If Mr. Doherty approves the franchise as changed it will be printed and copies distributed among the civic organizations and the people. If it does not meet with his approval, then Mr. Doherty will be asked to return to Toledo for further conferences. In the meantime Frank R. Coates, president of the company, will meet with the commission to discuss clauses relating to rates of fares, transfers, contracts for power and other matters. Mr. Doherty informed the committee that he would accept anything that President Coates approved. When an agreement is finally reached, the franchise will be submitted to the voters.

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**Increase in Wages in Allentown.**—An increase of 2 cents an hour in the wages of its motormen and conductors has been announced by the Lehigh Valley Transit Company. This is the second raise granted the men within a year.

**Engineers to Report to Special Rhode Island Commission.**—The special commission which is investigating the affairs of the Rhode Island Company, Providence, R. I., has engaged the engineering firm of Sloan, Huddle, Feustel & Freeman to report upon the various matters recently outlined by Chairman Zenas W. Bliss, as the commission's preliminary program.

**Suit Against Transit Construction in Philadelphia Dismissed.**—The taxpayers' suit instituted by Frank W. Fluck to restrain the city of Philadelphia, Pa., from proceeding with construction of the new transit high-speed lines has been dismissed by Common Pleas Court No. 4. Mr. Fluck instituted his proceedings on the ground that the $67,100,000 transit loan election in May, 1916, was illegal.

**More Indiana Companies Surrender Franchises.**—The Fort Wayne & Northern Indiana Traction Company, the Wabash Valley Utility Company and the Decatur & Fort Wayne Railroad have filed with all municipalities affected and with the Public Service Commission of Indiana formal notice of the surrender of their franchises and of their intention to operate under indeterminate permits through the utility commission.

**Employees Granted Increase in Wages.**—Arbitrators who have had the matter under consideration for about three weeks recently granted employees of the Cleveland, Painesville & Eastern Railway, Willoughby, Ohio, an increase in wages, covering a period of three years. They will receive 31 cents an hour for the first year, 33 cents for the second year, and 35 cents for the third year. The increase amounts to about 15 per cent and the contract dates from May 1.

**Pittsfield Labor Agreement Reached.**—At a conference in Pittsfield, Mass., on July 10, C. Q. Richmond, general manager of the Berkshire Street Railway, agreed with representatives of the employees' union to sign a new wage scale. The agreement is to have a term of one year. Under its provisions platform men will receive a wage increase of about 7 per cent. Other union employees in general will receive a 7.5 per cent increase, with the exception of twenty linemen now on strike.

**Electric Railway Responsible for Portion of Cost of Grade Crossing Elimination.**—On July 3 the Ohio Supreme Court dismissed the petition of the Cincinnati Traction Company against the city of Cincinnati, involving the payment of $61,220 alleged to be due as the company's share of the cost of eliminating the grade crossing at Ludlow Avenue and the Baltimore & Ohio Southwestern Railroad tracks in Cincinnati, on the ground that the Hamilton County Court of Appeals had no right to entertain the appeal case and that no other constitutional question is involved. If the case is carried no further the company must pay the amount claimed.

**Belt Line to Be Abandoned.**—The City Council of Dunkirk, N. Y., has voted to permit the Buffalo & Lake Erie Traction Company, Buffalo, N. Y., to abandon its belt line service in Dunkirk. This action is contingent upon the company surrendering its franchise covering all streets not used and assuming full responsibility for transporting cars of coal and other supplies over its line to the municipal electric light and water plant. The Point Gratiot line will be continued. Officials of the company say that the belt line was operated at a loss of about $17,000 a year. The company will construct a passenger and freight terminal in Dunkirk to cost about $20,000.

**Mayor Urges Suit to Revoke Franchises.**—Charging that the Tulsa Street Railway and the Oklahoma Traction Company, Tulsa, Okla., have failed to comply with the terms of their franchises as granted by the city of Tulsa, Mayor John H. Simmons has instructed City Attorney Meserve to bring suit for revocation of their franchises. The allegations on which the suit is to be based are that the companies have failed to provide ample equipment to care for the amount of traffic; that the companies have not maintained their roadbeds properly and that they have been negligent in caring for crossings. The Oklahoma Traction Company is building an interurban line from Tulsa to Sapulpa. It is rumored in Tulsa that a new company is being organized to consolidate and rehabilitate the properties.

**Taxes in Present Federal Bill.**—The Senate committee of finance, which has been considering the federal war revenue bill, reported its recommendations to the Senate on July 3. As reported, the bill now provides for a tax of 3 per cent on freight rates, 1 cent for each 25 cents or fraction on express rates, 5 per cent on passenger tickets except for commutation tickets for trips less than 40 miles or where the fare does not exceed 35 cents; and 5 per cent on parlor car and sleeping tickets. The bill also provides a tax of 15 per cent on the undistributed net income of corporations received during the year, subject to certain exceptions. One of these is that the company may deduct undistributed profits used for the establishment or maintenance of reserves required by law. Railway companies may also deduct expenditures for extensions, renewals or betterments, made with the approval of the Interstate Commerce Commission or of a state commission.

**Many Seattle Men Eligible for the Military.**—According to statistics compiled by the Puget Sound Traction, Light & Power Company, Seattle, Wash., 650 out of the 2300 employees in the Seattle division have registered as eligible for war service. Of the number found between the ages of twenty-one and thirty, inclusive, 338 are married and 312 single; 537 are Americans, fifty-six have taken out first papers and fifty-seven are aliens. The largest number of eligibles was found to be in the transportation department, which has 311 American citizens, twenty-five who have taken out first papers and fifteen aliens; of this number, 199 are married. Fifty-four per cent of the men are of conscription age. Company officials are completing a full census of all employees to find those who are especially fitted for other service, in the event vacancies occur, and also to ascertain whether any of the employees desire to be transferred to other departments. A similar census of company employees has been taken by the company on its Tacoma, Everett and Bellingham divisions and in the headquarters force. There are approximately 3600 employees of the Stone & Webster interest in the Puget Sound territory.

# Financial and Corporate

## Annual Reports

### Middle West Utilities Company

The comparative combined earnings statement of the various subsidiaries of the Middle West Utilities Company, Chicago, Ill., for the fiscal years ended April 30, 1916 and 1917, follows:

| | 1917 | 1916 |
|---|---|---|
| Gross earnings | $9,620,216 | $8,091,148 |
| Operating expenses and taxes | 6,117,460 | 5,013,388 |
| Net earnings from operation | $3,502,756 | $3,077,760 |
| Rentals on leased properties | 205,940 | 191,645 |
| | $3,296,816 | $2,886,115 |
| Interest paid on accruing to outside holders | 1,485,756 | 1,485,775 |
| Dividends and proportion of undistributed earnings to outside holders | 294,829 | 206,093 |
| Amortization of discount | 36,557 | 24,641 |
| Total earnings accruing to Middle West Utilities Company | $1,479,674 | $1,315,968 |

The gross earnings of the subsidiary companies in the last fiscal year showed a gain of $1,529,068 or 18.9 per cent. Of this only $388,960 came from newly acquired properties. Owing to the increase in the cost of operation, the operating ratio was 1.63 per cent higher in the last year. Yet the net earnings from operation increased $424,995 or 13.8 per cent. The street and interurban railways of the Middle West Utilities Company operate over 193 miles of track and provide 13.5 per cent of the aggregate gross earnings of all subsidiaries.

The total income of the Middle West Utilities Company for the year just closed was $1,824,069 as compared with $1,642,686 for the previous year. The balance for dividends was $1,026,585 as compared with $1,001,285. The various surplus accounts belonging to the company now aggregate $3,456,976. Of this $1,433,908 represents the holding company's portion of the surplus shown on the books of subsidiary companies.

### Pittsburgh Railways

The consolidated income statement of the Pittsburgh (Pa.) Railways and its affiliated companies for the year ended March 31, 1917, follows:

| | |
|---|---|
| Gross revenue from railway operation | $13,648,579 |
| Operating expenses and taxes: | |
| Maintenance of way and structures | $1,141,119 |
| Maintenance of equipment | 826,687 |
| Traffic | 31,656 |
| Power | 1,552,410 |
| Transportation | 3,681,353 |
| General and miscellaneous | 1,524,523 |
| Total | $8,757,748 |
| Taxes | 524,484 |
| Total | $9,282,233 |
| Income from railway operation | $4,366,346 |
| Income from auxiliary operations | 74,268 |
| Total operating income | $4,440,614 |
| Other income | 172,326 |
| Gross income | $4,612,940 |
| Deductions | 4,250,494 |
| Net income | $362,446 |

According to the annual report of the Philadelphia Company, from which the foregoing statement is taken, there has been a gradual improvement in business conditions throughout the Pittsburgh district during the past year, resulting in an increased traffic on all transportation lines. The gross earnings showed an increase of $1,081,595 or 8.8 per cent over the gross earnings reported for the preceding year of operation.

Owing to the unprecedented demands of manufacturers for all classes of labor, the company was obliged to increase the compensation paid to employees in all departments. This, with the increased cost of power and the higher prices for materials and supplies, resulted in an increase of $1,-

201,934 or 16.4 per cent in operating expenses. The actual increase for the year on account of higher wages amounted to $409,729.

There was expended during the year $1,505,537 for improvements, betterments and extensions, of which $1,233,373.32 was charged to capital account, and $272,164 against the income account on account of extraordinary expenditures for improvements, replacements and realignments. There was also charged to the income account $91,277 as amortization of the deferred account for the same class of work, and $2,230 for financing expenses. The surplus as of March 31, 1917, totaled $501,561 as compared to $508,064 the year before.

In regard to the need of increased revenues for electric railways, the annual report of the holding company contains the following statement for the Pittsburgh Railway:

"The street railway transportation industry in almost all of the large cities of the United States has been facing for many years a gradual increase in labor and material cost without any compensating increase in the fare charged to the public, with the result that there has been no safe margin above operating expenses and interest on the cost of properties. The situation is now becoming acute on account of the recent phenomenal advance in wages and material, especially coal. Owing to these conditions, there is now a general movement on foot to obtain an increase in fares. It will be the policy of this company to make every effort to secure remuneration for the additional cost of service it renders. Unless there is an increase in fares, the company will not be able to maintain its present high standard of service."

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## Republic Railway & Light Company

The combined comparative income statement of the Republic Railway & Light Company, Youngstown, Ohio, and its subsidiaries for the calendar years 1915 and 1916 follows:

| | 1916 | | 1915 | |
|---|---|---|---|---|
| | Amount | Per cent | Amount | Per cent |
| Gross earnings | $3,987,616 | 100.0 | $3,121,296 | 100.0 |
| Operating expenses, depreciation and taxes* | 2,327,406 | 58.3 | 1,874,082 | 60.0 |
| Net earnings | $1,660,210 | 41.7 | $1,247,214 | 40.0 |
| Other income | 20,965 | 0.5 | 1,753 | 0.0 |
| Gross income | $1,681,175 | 42.2 | $1,248,967 | 40.0 |
| Interest and subsidiary company dividends | 827,569 | 20.8 | 688,952 | 22.1 |
| Net income | $ 853,606 | 21.4 | $560,015 | 17.9 |
| Dividends on preferred stock | 311,484 | 7.8 | 311,484 | 10.0 |
| Balance | $ 542,122 | 13.6 | $ 248,531 | 7.9 |

*Depreciation for 1915 was not carried in operating expenses; in 1916 an amount of $46,562 for depreciation of equipment is included.

The gross earnings of the companies during 1916 increased $866,319 or 27.75 per cent as compared to those in 1915, while the operating expenses, depreciation and taxes increased $453,323 or 24.19 per cent. As a result the net earnings showed a gain of $412,995 or 33.11 per cent. The gross revenue from the electric light and power business increased 37.5 per cent, and the gross revenue from railways 22.8 per cent. The gross earnings of the company during 1917 up to the middle of March have showed a satisfactory increase, but there has been a substantial increase in the cost of materials, particularly coal, which will result in an increase of operating expenses for 1917.

As a result of a jump in other income from $1,753 to $20.965 during 1916, the gross income in the last year showed a gain of $432,208 or 34.60 per cent. Interest on subsidiary company dividends increased only $138,616 or 20.12 per cent, so that the net income represented a gain of $293,591 or 52.42 per cent. After paying the same preferred dividend as in 1915, the balance at $542,122 represented an increase of $293,591.

During 1916 the sum of $1,922,837 was expended upon improvements and betterments to the properties of the subsidiaries, including $1.264,037 on extensions and improvements to power house and electrical equipment and $658,800 upon extensions and improvements to the electric railway lines of the companies.

# Deposit of St. Louis Bonds Urged

### Holders of United Railways 4's of 1934 Requested to Deposit on Account of Negotiations with City

The holders of the general mortgage 4 per cent bonds of the United Railways, St. Louis, Mo., due July 1, 1934, are being asked to deposit their bonds. The chairman of the committee which is seeking the deposits is Breckenridge Jones, president of the Mississippi Valley Trust Company, St. Louis, Mo. The other members of the committee are David R. Francis, Jr., of Francis Brothers & Company, St. Louis; Allen G. Hoyt, vice-president of the National City Company, New York, and A. H. S. Post, president of the Mercantile Trust & Deposit Company, Baltimore. The formation of the committee grew indirectly out of the negotiations between a committee representing the United Railways and the officers of the city of St. Louis looking toward a settlement of the differences between them. The progress made with these negotiations has been noted previously in the ELECTRIC RAILWAY JOURNAL. The appeal of the committee to the holders of the 4 per cent bonds is as follows:

"Committees representing the city of St. Louis and United Railways are conferring and have partially agreed upon a plan of adjustment of the difficulties between the city and company.

"The proposed ordinance provides for a fixed valuation and a reduction in capitalization.

"Upon request, the undersigned owning and representing a large amount of the above bonds, believing it imperative that the holders of the general mortgage 4 per cent bonds should be in position to take prompt and concerted action for the protection of their interests, have consented to act as a committee to protect the holders of these bonds

"It is to the advantage of the bondholders to deposit their bonds promptly with the committee, in order to participate in benefits to be gained by concerted action on the part of the large majority of the bonds.

"We urgently request holders to deposit their bonds immediately, with Jan. 1, 1918, and subsequent coupons attached, with the Mississippi Valley Trust Company, St. Louis; the Farmers' Loan & Trust Company, New York, or the Mercantile Trust & Deposit Company, Baltimore, depositaries, under an agreement dated July 9, 1917, providing for such deposits.

"The committee will promptly pay any interest which may be received by it on the deposited bonds to the holders of the certificates of deposit representing the bonds, in respect whereof such payments of interest shall be made, deducting any income tax required to be withheld.

"Copies of the deposit agreement may be obtained by application to any of the depositaries."

### ANOTHER COMMITTEE SEEKS DEPOSITS

Another committee which has been organized in the interest of the holders of the 4 per cent bonds of the company is composed of N. A. McMillan, president of the St. Louis Clearing House; Edward Mallinckrodt, M. Kotany and J. Herndon Smith. Mr. McMillan is chairman of this committee. He is reported to have said that the members of the committee of which he is chairman were surprised to learn of the committee headed by Mr. Jones and that they had not determined what steps they will take.

Mr. Jones on July 9 announced his resignation from the board of directors of the North American Company, which controls the United Railways. In announcing his resignation, Mr. Jones stated that he had served as a director of the North American Company and for a time with the United Railways, believing that thereby he could best serve the interests of the holders of all classes of securities of the United Railways. Now that the settlement of differences between the city and the railway seemed likely he had, at the request of holders of a large amount of the company's 4 per cent bonds, decided to devote his energies to the protection of those bonds. In order that he might be relieved of any possible embarrassment arising from any conflict of interests, he had resigned as a director of the North American Company. Mr. Jones has not been a director of the United Railways since last winter.

## Rhode Island Assessments Certified

The Tax Commission of Rhode Island has certified to the treasurer for collection the following assessments upon Rhode Island's Street railways:

Rhode Island Company: Gross earnings, this year, $5,780,786 as against $5,025,150 last year, a gain of $755,635; amount of tax this year, $57,807 against $50,251 a year ago, an increase of $7,556.

Bay State Street Railway: Gross earnings this year, $185,771 against $183,398 last year, a gain of $2,372; amount of tax this year, $1,857 against $1,833 a year ago, an increase of $23.

Newport & Providence Railway: Gross earnings this year, $89,920 against $83,762 last year, a gain of $6,157; amount of tax this year, $899 against $837 a year ago, an increase of $61.

Norwich & Westerly Traction Company: Gross earnings this year, $34,942 against $72,608 a year ago; amount of tax this year $349 against $726 a year ago, a reduction of $376.

Shore Line Electric Railway: Gross earnings this year, $50,455; amount of tax this year, $504. New company.

The Shore Line Electric Railway is operating a line formerly run by the Norwich & Westerly Traction Company. The total for both companies for this year shows a gain of $12,788 in gross earnings over the figures of the Norwich & Westerly Traction Company of a year ago.

## Returns for Iowa Interurbans

From the thirty-eighth report of the Iowa Board of Railroad Commissioners, just now available, it appears that the 1915 gross operating earnings of interurban electric railways in the State were $2,923,033 as compared to $2,682,102 in 1914. The operating expenses, however, increased from $1,722,072 to $1,895,925, so that the net from operation in 1915 was $1,027,107 as compared to $960,030 the year before. The single-track mileage increased 44.75 miles to 472.48 miles—23.02 miles for electrified track of the Centerville, Albia & Southern Railway and 17.39 miles for new track of the Waterloo, Cedar Falls & Northern Railway being the largest items. The net earnings per mile of single track dropped from $2,244 in 1914 to $2,173 in 1915.

**American Light & Traction Company, New York, N. Y.**—The American Light & Traction Company has declared the regular quarterly dividend of 1½ per cent on its preferred stock. On the junior issue the regular quarterly dividend of 2½ per cent in cash and a dividend at the rate of 2½ shares of common stock on every 100 shares of common outstanding also has been declared. All the dividends will be paid on Aug. 1.

**American Water Works & Electric Company, New York, N. Y.**—H. Hobart Porter, president of the American Water Works & Electric Company, has issued a statement to stockholders announcing that the plan for funding the dividends accrued to April 27, 1917, upon the first preferred stock is to become operative. Signed consents and approvals have been received from most of the stockholders and the directors have voted to go ahead with the plan. The distribution of warrants for cash and new securities provided in the plan will be made to first preferred voting trust certificate holders of record at the close of business July 20 next. The first preferred stock to be issued under the plan will be entitled to cumulative dividends from April 27, 1917.

**Brooklyn (N. Y.) City Railroad.**—A quarterly dividend of 2½ per cent has been declared by the directors of the Brooklyn City Railroad, payable on July 16 to holders of record of July 5. This compares with 2 per cent quarterly since July, 1910.

**Minneapolis, St. Paul, Rochester & Dubuque Electric Traction Company, Minneapolis, Minn.** — Howard S. Abbott, master in chancery, on June 28 offered the property of the Minneapolis, St. Paul, Rochester & Dubuque Electric Traction Company for sale, but received no bids.

**Pacific Gas & Electric Company, San Francisco, Cal.**—According to the annual report of the Pacific Gas & Electric Company for the calendar year 1916, the operations of the Sacramento Street Railway, its railway subsidiary, showed a distinct improvement in the last year. Both the passengers carried and the revenue increased approximately 10.5 per cent over 1914, as compared to a 22 per cent decrease in 1915 and 1914. This is said to indicate a waning activity on the part of the jitneys. The gross revenue in 1916 was $442,303, while the passengers totaled 10,044,428, car miles 2,919,041 and car hours 299,873.

**Syracuse (N. Y.) Northern Electric Railway, Inc.**—Holders of certificates of deposit issued by the Central City Trust Company, Syracuse, N. Y., have been notified that inasmuch as the properties of the Syracuse & South Bay Electric Railroad and the Syracuse, Watertown & St. Lawrence River Railroad have been acquired by the Syracuse Northern Electric Railway, Inc., the securities of the new company have been issued and are now ready for distribution. Holders of certificates of deposit may on and after July 16 receive the new securities.

## Dividends Declared

Brooklyn (N. Y.) City Railroad, quarterly, 2½ per cent.

Chicago (Ill.) Railways, 8 per cent, participating certificates, Series 1.

Connecticut Railway & Lighting Company, Bridgeport, Conn., quarterly, 1 per cent, common and preferred.

Kentucky Securities Corporation, Philadelphia, Pa., quarterly, 1½ per cent, preferred.

New Orleans (La.) City Railroad, 2½ per cent, preferred; 1 per cent, common.

Ottumwa Railway & Light Company, Ottumwa, Iowa, quarterly, 1¾ per cent, preferred.

Pacific Gas & Electric Company, San Francisco, Cal., quarterly, 1¼ per cent, common.

Puget Sound Traction, Light & Power Company, Seattle, Wash., quarterly, 75 cents, preferred.

Railway & Light Securities Company, Boston, Mass., 3 per cent, common and preferred.

## Electric Railway Monthly Earnings

| Period | | Operating Revenues | Operating Expenses | Operating Income | Fixed Charges | Net Income |
|---|---|---|---|---|---|---|
| BERKSHIRE STREET RAILWAY, PITTSFIELD, MASS. | | | | | | |
| 1m., May, | '17 | $87,824 | *$75,825 | $11,999 | $27,557 | †‡$15,143 |
| 1 " " | '16 | 84,466 | *68,658 | 15,808 | 27,850 | †‡11,809 |
| 5 " " | '17 | 418,803 | *363,378 | 55,425 | 137,925 | †‡82,025 |
| 5 " " | '16 | 375,308 | *336,170 | 39,138 | 122,810 | †‡82,664 |
| COMMONWEALTH POWER, RAILWAY & LIGHT COMPANY, GRAND RAPIDS, MICH. | | | | | | |
| 1m., May, | '17 | $1,512,014 | $844,989 | $667,025 | $524,189 | $142,836 |
| 1 " " | '16 | 1,328,075 | 631,766 | 696,309 | 496,250 | 200,059 |
| 12 " " | '17 | 17,919,035 | 9,381,593 | 8,537,442 | 6,088,988 | 2,448,454 |
| 12 " " | '16 | 15,630,700 | 7,455,760 | 8,174,940 | 5,655,231 | 2,419,709 |
| CONNECTICUT COMPANY, NEW HAVEN, CONN. | | | | | | |
| 1m., May, | '17 | $811,350 | *$662,323 | $149,027 | $95,726 | ‡$75,442 |
| 1 " " | '16 | 800,058 | *528,341 | 271,717 | 98,009 | ‡196,284 |
| 5 " " | '17 | 3,902,262 | *3,132,485 | 769,777 | 479,538 | ‡371,930 |
| 5 " " | '16 | 3,678,610 | *2,578,535 | 1,100,075 | 489,921 | ‡723,574 |
| NEW YORK & STAMFORD RAILWAY, PORT CHESTER, N. Y. | | | | | | |
| 1m., May, | '17 | $31,020 | *$26,516 | $4,504 | $7,982 | †‡$3,432 |
| 1 " " | '16 | 33,099 | *25,542 | 7,557 | 7,979 | †‡376 |
| 5 " " | '17 | 135,778 | *137,725 | †1,947 | 3,925 | †‡41,647 |
| 5 " " | '16 | 131,654 | *117,839 | 13,815 | 39,920 | †‡25,905 |
| NEW YORK, WESTCHESTER & BOSTON RAILWAY, NEW YORK, N. Y. | | | | | | |
| 1m., May, | '17 | $49,535 | *$47,077 | $2,548 | §$6,346 | †‡$3,088 |
| 1 " " | '16 | 48,450 | *43,845 | 4,605 | §5,589 | ‡348 |
| 5 " " | '17 | 228,164 | *232,312 | †4,148 | §35,349 | †‡33,894 |
| 5 " " | '16 | 211,302 | *258,931 | †47,629 | §32,520 | †‡72,330 |
| RHODE ISLAND COMPANY, PROVIDENCE, R. I. | | | | | | |
| 1m., May, | '17 | $489,768 | *$400,457 | $89,311 | $119,911 | †‡$30,037 |
| 1 " " | '16 | 493,296 | *354,687 | 138,609 | 118,579 | ‡21,120 |
| 5 " " | '17 | 2,137,706 | *1,952,814 | 865,892 | 597,081 | †‡174,733 |
| 5 " " | '16 | 2,228,505 | *1,708,459 | 520,046 | 557,623 | ‡19,847 |
| WESTCHESTER STREET RAILROAD, WHITE PLAINS, N. Y. | | | | | | |
| 1m., May, | '17 | $21,862 | *$23,687 | †$1,825 | $2,168 | †‡$3,965 |
| 1 " " | '16 | 22,964 | *22,418 | 551 | 1,798 | †‡1,219 |
| 5 " " | '17 | 92,529 | *112,117 | †19,588 | 10,257 | †‡29,709 |
| 5 " " | '16 | 95,654 | *104,781 | †9,127 | 8,750 | †‡17,751 |

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*Includes taxes. †Deficit. ‡Includes non-operating income. §Excludes interest on bonds, charged income and paid by the New York, New Haven & Hartford Railroad under guarantee; also interest on notes held by the New York, New Haven & Hartford Railroad, not credited to the income of that company.

# Traffic and Transportation

## Skip Stop in Buffalo

### Thirty-Day Trial Proposed on Two of the Busiest Lines of the International Railway

Beginning on July 15 and continuing for thirty days, the International Railway, Buffalo, N. Y., will operate cars over two of its busiest lines on the skip-stop plan. All cars operating over Main Street, between Chippewa Street and the city line, will stop at every second corner, except at transfer points, and the same rule will be made effective over Elmwood Avenue, between Chippewa Street and Hertel Avenue. The skip-stop plan will not be made effective in the congested downtown business district. The company's decision to try out the skip-stop plan on its two busiest lines is the result of one of the recommendations made by the municipal traffic commission appointed by Mayor Louis P. Fuhrmann.

#### TRIAL TO BE MADE ON TWO LINES

The plan to eliminate about 50 per cent of the car stops on these two lines outside of the business district was announced in a news article in the daily papers, and was followed up by display announcements in all of the company's cars. The announcements in the cars were signed by the Buffalo Traffic Commission, and urged the co-operation of the public and trainmen to make the skip-stop plan a success.

Peter Witt, former street railway commissioner of Cleveland, Ohio, conferred in Buffalo with officials of the International Railway and members of the municipal traffic commission at the time the committee decided to recommend the trial of the skip-stop plan on two Buffalo lines. John O. Weigel, general superintendent of traffic of the International Railway; Thomas Penney, vice-president and general counsel of the company, and a member of the traffic commission, and also E. J. Dickson, vice-president of the company, attended the conference.

White bands 3 ft. wide will be painted on trolley poles at corners where the cars will stop. The cars will skip every other block, making the stops at one lot of corners on the outbound trip, and at another lot on the inbound trip.

During the first week of the trial, uniformed supervisors will be stationed at numerous corners along the line to inform the public where cars will stop, and designate what corners will be skipped.

Five other lines which operate in Main Street, between Florence Avenue and Perry Street, will also operate on the skip-stop plan while the cars are in Main Street, except that south of Chippewa Street, in the congested retail shopping district, all stops will be made.

## Service Talks for Employees

### President Coates Sends Out Talks to Emphasize the Need of Courtesy, Common Sense, Kindness and Team Work

The problem of getting the best service from employees has been undertaken by Frank R. Coates, president of the Toledo Railways & Light Company and other properties in Toledo, Ohio, all operated by H. L. Doherty & Company. Mr. Coates has sent four talks to his men, each dealing with a different phase of the problems which present themselves daily. In the first talk, which was entitled "Courtesy," Mr. Coates said, in part:

"Be courteous. Courtesy consists of those kindly, helpful acts we render others that we like to receive ourselves. A friendly 'good morning,' a cordial 'thanks,' a cheery word or a pleasant smile from the man who comes directly in contact with the public—will do more to gain good-will and friendship than anything else."

The following is an extract from the talk on "Common Sense": "Situations often arise when a man must exercise his own common sense and let his reason tell him the right thing to do—the safe thing to do. 'The best safety device is a careful person.' Without thought and care on the part of the man behind the device, it will avail little."

The third of the series was on the subject of "Kindness." The following quotation is taken from this talk: "Kindness is an attribute that all may cultivate—it is a mark that always distinguishes the big man—no matter what his work may be. Kindly deeds to others will pay large dividends to ourselves in human happiness that no amount of money can buy. Be kind."

In the last talk Mr. Coates emphasized the necessity of team work. He said that neither absolute safety in car operation nor the good-will of patrons could be obtained without co-operation between the members of the car crew. Each of the talks was signed by Mr. Coates, to give the personal touch so essential in impressing the employee.

## Inquiry Into Gorge Wreck

### Officials of the Railroad Testify Before the Coroner—Inquiry to Continue

Officials of the Niagara Gorge Railroad, Niagara Falls, N. Y., who were called to testify at the coroner's inquest into the fatal accident near the Whirlpool Rapids in the lower Niagara Gorge on the afternoon of July 1 placed a large part of the responsibility for the wreck upon the National Guardsmen who saw the foundations of the track slide into the river and did not flag the approaching car. Among the witnesses called were E. E. Nicklis, superintendent of the Gorge Route; William Piper, assistant superintendent; Joseph Mondia, track foreman; Louis C. Crandall, motorman of the wrecked car, passengers, and several alleged eye-witnesses.

#### HOW THE LINE WAS PROTECTED

Company officials testified that the retaining wall supporting the tracks at the brink of the lower gorge at the point which gave way was a dry wall of stones piled up with no cement binder; that the power was not shut off when the company received warning because of the fear that if this were done it might endanger other cars on the steep grades; that there is no telephone signal dispatching system along the lower gorge between Lewiston and Niagara Falls, because the roar of the rapids is too great to permit anyone to hear over a telephone, and that an inspector rushed to the scene of the wash-out on a special car, but reached the point a few minutes after the car had toppled into the river.

A track inspector testified that the line between Lewiston and Niagara Falls is inspected every morning before traffic is started over the route. Loose boulders on the cliffs above are blasted out and a careful watch is always kept on the entire route.

The motorman of the wrecked car said he received the first warning of the undermined roadbed when the track began to sag under the car. Before he realized what was happening, the car toppled over the embankment into the river.

The inquest was adjourned until July 12 when additional witnesses were called.

There is still some doubt as to the total number of passengers on board the wrecked car. Estimates vary, but municipal authorities of Niagara Falls believe there are about fifteen passengers still missing in addition to the ten who were killed and one who died later in a hospital. At least three persons are known to be missing.

At a special meeting of the board of directors of the company on July 3, Burt L. Jones, vice-president and general manager, reviewed the wreck and in a lengthy prepared statement given to the daily newspapers said that the National Guardsmen who saw the roadbed slip into the gorge "should certainly have flagged the car in order to avoid the catastrophe." Mr. Jones also denied the statement of four witnesses, who said they warned the company twenty minutes in advance of the wreck that the track had given away.

## Pension System for Duluth

The Duluth (Minn.) Street Railway recently established a pension system for its employees. The management of the plan is placed in the hands of a pension board composed of one official and two employees who will be appointed by the president of the company. No part of the pension payments is to be contributed by the employees. Whenever it shall be found that the basis of pension payment creates demands in excess of the company's revenue available for pensions a new basis ratably reducing existing and future payments shall be established by the pension board, with the approval of the president.

Any employee of the company, male or female, may be declared eligible for a pension. Granting of pensions is based upon the number of years of continuous service in the company's employ, the average amount of salary or wages received during the last ten years of service and the character and quality of service rendered. Sixty-five and seventy years are the ages specified at which employees may be pensioned, providing their annual income has not averaged more than $2,500 during the preceding ten years. Any employee receiving that amount or less who has become permanently disabled or disqualified for service by accident or sickness may at the discretion of the pension board be retired from service for a given period of time and granted a monthly pension. The amount of such pensions shall be determined by the pension board. It shall be in lieu of the regular pension and will not be granted if the employee is receiving compensation under the State law. All payments will be made monthly. A retired employee receiving a pension is permitted also to engage in certain other occupations.

In addition to the pension system the company recently secured group insurance for its entire force. All employees who have been in the service of the company for a year or longer are insured in the sum equal to their annual wage or an amount not less than $1,000. The company is also paying a war bonus of 5 per cent of the monthly wage during the period of the war to men who have been employed for one year and 10 per cent of their wage to men in the service less than one year. The "war bonus" will not be considered in determining the average salary to fix the amount of pensions.

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**Near-Side Stop Adopted in Rochester.**—The Rochester lines of the New York State Railways have just put the near-side stop into operation on the entire system. Barring a few complaints, the plan has met general approval.

**Accident on Brooklyn Elevated.**—Several persons were injured on July 7 when one car of a three-car train on the Broadway line of the Brooklyn (N. Y.) Rapid Transit Company leaped the rails and plunged off the elevated railroad into the street at Broadway and Myrtle Avenue.

**Briefs Filed in Kansas City Fare Case.**—Briefs have been filed in the "Maywood" case of the Kansas City (Mo.) Railways, involving suburban fares. The case will be argued in Jefferson City on July 12. No further testimony will be received. The issues involved were stated briefly in the ELECTRIC RAILWAY JOURNAL for June 23, page 1163.

**Souvenir Swatter in Beaver Valley.**—The Beaver Valley Traction Company, New Brighton, Pa., is issuing a fly swatter as a "Safety Always" souvenir to the householders along its lines. The message carried on one side is "Beaver Valley Traction Company, Do as We Do—Think of Safety Always." On the other side the legend reads "Safety Always, Save Lives, Swat Flies."

**Fare Zone Added to Bangor Suburban Zone.**—The Bangor Railway & Electric Company, Bangor, Maine, has increased the fare on its Old Town division. This branch is 14.73 miles in length. Previous to the increase the company received a 15-cent fare. It has now added another fare limit, making the fare 20 cents instead of 15 cents for the entire distance. The increase became effective on June 19.

**State License for Jitneys in Texas.**—Jitneys operating in cities of Texas will be required to pay the State license fee of $20 a year, as provided for commercial vehicles under the new State highway law, according to a ruling of the State attorney general's department. Notice has been given by city authorities in most cities to the effect that jitneys must cease operation after July 15 unless the State license is secured.

**Six-for-a-Quarter Fares Withdrawn.**—On July 1 the Kentucky Traction & Terminal Company, Lexington, Ky., discontinued the sale of six metal checks, good for city fares, at 25 cents. The announcement was made on the day before the new rule went into effect. Checks sold before the new rule went into effect will be honored until they are exhausted. In connection with the announcement the company explained that costs of every character have increased to the point where it is no longer possible to operate at the reduced fare.

**Pacific Electric Adopts Courtesy Code.**—The Pacific Electric Railway, Los Angeles, Cal., has perceived the value of a standard courtesy code for trainmen such as has been in use for some time on the Brooklyn (N. Y.) Rapid Transit System and which was described in the ELECTRIC RAILWAY JOURNAL for March 24, page 544. Lessons in courtesy, based on the B. R. T. code, are being published in the *Pacific Electric Magazine* and every effort is being made to impress upon the employees of the company the need of politeness in their dealings with patrons.

**Springfield Jitneys Take 20 Per Cent of Business.**—The Springfield (Mass.) Street Railway recently made a study of the extent of jitney competition in that city. It reported that the jitneys carried on one day 25,379 passengers and took in $1,271.95 in revenue. The railway company on that day carried 110,711 passengers. Nearly 40,000 of this number included patrons who offered transfers in payment of fares and children who rode on half-fare tickets. It is said that jitney earnings in that city average about 25 per cent of the revenue realized by the electric railway.

**Two Ohio Towns Seek Reduction in Fare.**—The villages of Lockland and Wyoming have filed suits in the Common Pleas Court at Cincinnati against the Ohio Traction Company to secure a reduction in fare. The franchises granted the company contain the stipulation that in the event the fare between Cincinnati and Carthage is ever reduced, the villages are to have the same rate. Through the "loop" lease, the company has agreed to grant a 5-cent fare to the city limits which gives the people of Carthage the lower fare. The suits are based on this condition.

**Car Men Submit Jitney Ordinance.**—The employees of the Bay State Street Railway in Brockton, Mass., recently submitted to the Board of Aldermen an ordinance drawn up to effect more stringent regulation of jitney buses in that city. Among the requirements set forth in the ordinance was a $500 bond per passenger up to the number the vehicle is authorized to carry, and business is to be conducted along fixed routes and at regular rates. No action was taken by the board. A hearing will be held on July 16 which the public and the Common Council are invited to attend.

**One-Man Cars Successful in Everett.**—The Everett Railway, Light & Water Company, Everett, Wash., has found the automatic one-man cars which it has operated for several months on the Riverside-Bayside line in Everett so satisfactory that orders have been placed for twelve more cars of the same type to be delivered next fall. When these cars are received the company will increase its service, tentative plans for which provide for the rerouting of the lines. Application has been made to the City Council for permission to make necessary track changes for the new service.

**Boston "L" Issues Safety Bulletin.**—A small folder containing short talks on safety is being issued by the Boston (Mass.) Elevated Railway for the use of all employees in the train service. The first two issues deal with the subjects "Carelessness" and "Courtesy" respectively. The company is anxious to make the accident record for 1917 the best in its history, and no doubt these bulletins, furnishing regular reminders to the train men, will be very helpful. The safety messages are prepared by H. A. Pasho, superintendent of rapid transit lines, and Edward Dana, manager of surface transportation.

**Atlantic City Suburban Fare Reduced.**—The Atlantic City & Shore Railway, Atlantic City, N. J., has announced that for the benefit of those who commute daily from mainland towns to the shore sixty-trip tickets will hereafter be sold for $3 for the 5-mile ride. The company's concession is contrary to the decision rendered by the New Jersey Public Utility Commission two years ago at the close of a fight for a 10-cent fare. In this decision the commission held that the company could not afford to carry passengers across 5 miles of no-stop territory for a nickel. The new rule applies also to the Atlantic & Suburban Railway, which is under control of the Shore Line management.

**Skip-Stop and Fare Problems in Richmond.**—*Public Service News*, published by the Virginia Railway & Power Company, Richmond, Va., in its issue for July 5 has answered eighteen questions about the skip stop drawn from the experience of the United Railways & Electric Company, Baltimore, in operating under that plan. The company also makes an appeal to its readers for their support, using as its text that part of the President's proclamation of April 15 which dealt with the railroads. The company says that its patrons can help it to perform its functions properly, and render a more adequate service by (1) urging the Council to give the skip-stop plan a ninety days' trial, and (2) by supporting the company's plea for a straight 5-cent fare.

**More Skip Stops in Detroit.**—The Detroit (Mich.) United Railway placed the skip-stop plan in service on its Hamilton line on July 8. The City Council of Detroit and the Village Council of Highland Park united in giving permission for the operation of skip stops on the Hamilton line. The Detroit resolution provided for skip stops in both directions between Grand River Avenue and the northerly city limits. The Highland Park resolution authorized skip-stop operation through the village. This applies to the line operating over Oakman Boulevard. When the Hamilton service is extended to the Six Mile Road, it will also be under the skip-stop plan. On July 1 the skip stop was installed by the company on its Fort line. This method of operation has been in use on the company's Woodward and Jefferson lines for several months.

**Election Results on Jitney Ordinances.**—On June 4 the city of Portland, Ore., held its municipal election, an important feature of the election program being the matter of jitney regulation. The results of that election were reviewed on page 1070 of the ELECTRIC RAILWAY JOURNAL for June 9. It was stated that the ordinance requiring a $2,500 jitney bond was carried by 32,000 to 16,000; that the franchises calling for satisfactory regulation were also carried by heavy vote and that the commissioner who has stood for unregulated jitney service for the last two years was defeated in his run for mayor. The official count on all of these initiative ordinances and charter amendments have been completed by the city auditor, A. L. Barbur. The results are as follows: Jitney bonds—yes, 31,545; no, 15,518; jitney-free streets—yes, 15,466; no, 30,787; Carver electric railway franchise—yes, 26,438; no, 18,585; jitney franchise No. 1—yes, 26,438; no, 18,585; jitney franchise No. 2—yes, 26,223; no 18,445; jitney franchise No. 3—yes, 25,939; no, 18,335; jitney franchise to Linnton—yes, 28,864; no, 15,502.

**168,202,150 Revenue Passengers in New York City in April.**—Electric railways operated in New York City during the month of April carried a total of 168,202,150 revenue passengers. This, according to a report issued by the Public Service Commission for the First District of New York, was an increase of 4,460,997 over the figures for April, 1916. The total revenue from passenger transportation for the month was $8,333,081, against $8,082,199 for April, 1916, showing an increase of $250,882. The total operating revenue amounted to $8,769,919, against $8,479,693 in the corresponding period of 1916. Of the total number of passengers carried in April the Hudson & Manhattan Railroad shows 6,016,343; the Interborough Rapid Transit Company, subway division, 37,826,100, and the elevated division, 29,734,529. The Brooklyn Rapid Transit Company in all its connections carried 48,800,019 passengers, and the Manhattan surface roads 32,122,337, of which the New York Railways carried 20,576,771. The number of transfers collected by all companies in April was 28,437,926, which shows a decrease of 938,397 from the corresponding month in 1916. The total of taxes paid by the electric railways for the month amounted to $609,610, against $545,894 for April, 1916. The foregoing figures are exclusive of four small companies, the combined passenger fare collections of which average about $5,000 a month.

# Personal Mention

**C. N. Hebner** has been appointed secretary and treasurer of the Alton & Jacksonville Railway, Alton, Ill., to succeed C. A. Caldwell.

**H. J. Millett** has been appointed roadmaster for the United Traction Company at Troy, N. Y., succeeding C. A. Smith, resigned.

**D. Hudson** has been elected vice-president of the Fort Scott Gas & Electric Company, Fort Scott, Kan., to succeed E. C. Gates.

**Van Horn Ely**, Philadelphia, has been elected president of the Jersey Central Traction Company, Keyport, N. J., to succeed W. W. Laird.

**J. J. Schweitzer** has been appointed superintendent of shops of the Cincinnati (Ohio) Traction Company to succeed J. H. Elliott.

**W. W. Prater** has been appointed roadmaster of the Clinton, Davenport & Muscatine Railway, Davenport, Iowa, to succeed J. Wideman.

**A. Coffman** has been appointed claim agent of the Roanoke Railway & Electric Company, Roanoke, Va., succeeding C. B. Short.

**F. A. Hurlbut** has been appointed chief engineer of the East St. Louis & Suburban Railway, East St. Louis, Ill., to succeed P. S. Tuncil.

**C. F. Conn** has been appointed secretary of the J. G. White Engineering Corporation, New York, N. Y., to succeed A. N. Connett, Jr.

**H. F. Barraclough** has been appointed purchasing agent of the Salt Lake & Ogden Railway, Salt Lake City, Utah, to succeed F. D. Brown.

**A. O. S. Havens** has been appointed secretary of the Trenton, Lakewood & Seacoast Railway, Lakewood, N. J., to succeed Archibald D. Davis.

**Benjamin R. Duff** has been appointed claim agent of the New York & North Shore Traction Company, Roslyn, N. Y., to succeed George F. Orthel.

**H. A. Laxon** has been elected president and general manager of the Uncanoonuc Incline Railway & Development Company, Manchester, N. H.

**W. H. Whatley** has accepted the position of master mechanic for the Macon Railway & Light Company, Macon, Ga., succeeding E. G. Daniels.

**W. J. Musser** has been appointed secretary of the Southern Illinois Light & Power Company, with office at St. Louis, Mo., succeeding Mary McCord.

**Gus A. Kohler** has been appointed secretary of the Springfield Terminal Railway & Power Company, Springfield, Ohio, to succeed J. F. McGrew.

**M. Kerwin** has been appointed manager of Kent House Park at Montmorency Falls for the Quebec Railway, Light & Power Company, Quebec, Que.

**Elmer Schoggan** has been appointed claim agent of the Little Rock Railway & Electric Company, Little Rock, Ark., to succeed the late A. B. Chichester.

**John O. Motto** has been appointed general freight and passenger agent of the Winona Interburban Railway, Warsaw, Ind., in place of W. D. Stansifer.

**W. T. Stewart**, heretofore vice-president of the Gulfport & Mississippi Coast Traction Company, Gulfport, Miss., has been elected president of the company.

**H. H. Bechtel** has been appointed secretary of the Twin State Gas & Electric Company, Brattleboro division, Brattleboro, Vt., to succeed G. L. Halstead.

**J. S. Rice** has been appointed chief dispatcher for the Salem & Penns Grove Traction Company, Penns Grove, N. J., to succeed Thomas B. Ackarman.

**C. A. Forrest** has been made treasurer for the Brattleboro division of the Twin State Gas & Electric Company, Brattleboro, Vt., to succeed A. D. Foster.

**A. R. Evans** has been elected president of the Fox & Illinois Union Railway, Aurora, Ill., to succeed H. H. Evans, who becomes vice-president of the company.

**S. G. McMeen** of Columbus, Ohio, has been elected vice-president of the Chattanooga Railway & Light Company, Chattanooga, Tenn., to succeed M. S. Hopkins.

**George McIntosh** has been appointed chief engineer of power stations for the Ohio Electric Railway & Power Company, Pomeroy, Ohio, to succeed Daniel Rizer.

**J. B. Harnish**, heretofore vice-president of the Lancaster & York Furnace Street Railway with office in New Danville, Pa., has been elected president to succeed Paul Heine.

**J. W. Brannon**, heretofore chief engineer of power stations for the St. Francois County Railroad, Farmington, Mo., has been made superintendent to succeed Richard Doyle.

**T. H. Purdom** has been elected vice-president of the London & Lake Erie Railway & Transportation Company, London, Ont., to succeed George B. Woods, who became president of the company.

**R. J. Pike**, formerly secretary to R. P. Stevens, president of the Mahoning & Shenango Railway & Light Company, Youngstown, Ohio, has been made purchasing agent of the company to succeed C. O. Bailey.

**A. J. Boardman**, division superintendent of the Terre Haute, Indianapolis & Eastern Traction Company, Indianapolis, Ind., has received a commission as captain in the Ordnance Officers' Reserve Corps.

**F. W. Bacon**, vice-president of the Kentucky Traction & Terminal Company, Lexington, Ky., has succeeded E. Mendenhall as vice-president of the Ohio River Electric Railway & Power Company, Pomeroy, Ohio.

**W. E. Parker** has been promoted to the position of master mechanic for the New Bedford & Onset Street Railway. Mr. Parker entered the company's service ten years ago as a mechanic, in which capacity he has served continuously since that time.

**W. C. Callaghan**, acting manager of the Shore Line Electric Railway, Norwich, Conn., for the last year, has returned to the staff of The J. G. White Management Corporation, New York, N. Y., as their contract in connection with the operation of the Shore Line property expired on June 30.

**J. H. Brown**, traffic manager of the San Francisco-Oakland Terminal Railways, Oakland, Cal., has resigned to assume charge of the Monta Vista Rancho, which consists of 2000 acres of olive orchard in Shasta County. Mr. Brown will be succeeded by G. E. Sheldon, his former chief clerk on the San Francisco-Oakland lines.

**W. B. Miser**, formerly with the Illinois Traction System at Jacksonville, Ill., has been appointed manager of the Drumright Light & Power Company, at Drumright, Okla., one of the new properties recently acquired by H. M. Byllesby & Company. The Drumright Light & Power Company will be included as part of the enlarged Oklahoma Gas & Electric Compay.

**Homer Ruhl**, heretofore general freight and passenger agent of the Fort Wayne & Decatur Traction Company, Fort Wayne, Ind., has been appointed auditor, effective July 1, to succeed P. C. Reinking, who resigned to accept a position with the Fort Wayne Corrugated Paper Company. Mr. Ruhl will be succeeded by Adrian Baker.

**Walter A. Scott** has been appointed superintendent of the Exeter, Hampton & Amesbury Street Railway, Exeter, N. H., with headquarters at Hampton. Mr. Scott has been employed by that company since 1903. He began as a conductor and later served as starter at Hampton Beach. He was promoted to the position of assistant treasurer of the company in 1914 to fill the vacancy caused by the death of Edward P. Weeks.

**Warren I. Lee**, Brooklyn, N. Y., former first deputy comptroller of New York State, has been appointed by the Public Service Commission for the First District of New York as assistant counsel to the commission. Mr. Lee's assignment will be under Leroy T. Harkness, chief of rapid transit, in connection with claims of subway contractors against the city. Several such claims have recently been filed against the city for large amounts.

**L. E. Myers**, president of the L. E. Myers Company, Chicago, Ill., and president of several public service corporations including the Bessemer Railway & Light Company, Bessemer, Mich., will report at Washington, D. C., on July 15 to assist Herbert C. Hoover in the work of supervision of federal food control. The definite work which Mr. Myers will do has not been assigned, but it is reported that he will take charge of the bureau of special investigation.

**W. C. Klein**, who has recently been appointed master mechanic of the Easton (Pa.) Transit Company, entered electric railway work in the shops of the Metropolitan Street Railway, New York, N. Y., under Thomas Mellen in 1901. In 1903 he resigned from the Metropolitan Street Railway to become a general inspector with the Albany & Hudson Railroad. He continued with that company for several years and then engaged in shop work with the General Electric Company for two years. In 1908 he returned to New York with the New York Railways, the successor to the Metropolitan Street Railway, and served for four years as shop foreman and draughtsman under William McIver, H. H. Adams and J. S. Doyle. In 1912 and 1913 Mr. Klein was connected with the Federal Storage Battery Company. From 1913 to 1916 he was with the Brooklyn (N. Y.) Rapid Transit System as draughtsman and general inspector.

E. C. DEAL

**E. C. Deal** has resigned as vice-president and general manager of the public utility properties until recently controlled by W. N. Coler & Company, New York, N. Y., to become manager of the Trinidad Electric Transmission, Railway & Gas Company, Trinidad, Col. Mr. Deal gained his early experience with the Georgia Electric Light Company, which he served in various capacities from 1894 to 1898. He then entered the employ of Stone & Webster, Boston, Mass., but left them in 1904 to go with the Gas & Electric Company of Bergen County, New Jersey, as chief engineer in charge of the company's properties in more than forty municipalities in northern New Jersey. When that company was absorbed by the Public Service Corporation of New Jersey Mr. Deal became superintendent of the latter company's electric properties in central New Jersey. He severed his connection with the Public Service Corporation in 1908 to go with the firm of W. N. Coler & Company as manager and engineer of public service properties owned by them. Following the acquisition of the property of the Augusta Railway & Electric Company and the Augusta-Aiken Railway & Electric Company by a syndicate in which J. G. White & Company, Inc., New York, were interested, Mr. Deal resigned from Coler & Company to become general manager of the Augusta-Aiken Railway & Electric Corporation, the successor company in Augusta. This was in April, 1911. In April, 1913, he was elected vice-president of the company in addition to general manager, and was also made vice-president and general manager of the Georgia-Carolina Power Company, owned by the same interests. Mr. Deal resigned from these companies on March 1, 1914, to become connected again with W. N. Coler & Company as vice-president and general manager of the public utility properties owned and operated by them, and located in different sections of the country. Mr. Deal is past fourth vice-president of the National Electric Light Association, and past-president of the Southeastern section of the National Electric Light Association. The Trinidad Electric Transmission, Railway & Gas Company, with which Mr. Deal has now become connected, is the successor to the Southern Colorado Power Company. It controls the city railway system in Trinidad and a system of interurban electric railways extending from that city and operates about 200 miles of transmission lines in southern Colorado and northern New Mexico.

# Construction News

Construction News Notes are classified under each heading alphabetically by States.

An asterisk (*) indicates a project not previously reported.

## FRANCHISES

**Santa Ana, Cal.**—The Pacific Electric Railway has asked the Board of Supervisors for a fifty-year franchise to construct an electric railway from Santa Ana to Tustin. The line will leave the Santa Ana-Huntington Beach line at a point between Chestnut and McFadden Streets and will enter Tustin by way of Sixth Street.

**Columbus, Ind.**—The Indianapolis, Columbus & Southern Traction Company, as owner, and the Interstate Public Service Company, as lessee, have surrendered their interurban railway franchise to the city of Columbus and will apply to the Public Service Commission of Indiana for an indeterminate permit under which to operate.

**Detroit, Mich.**—The Detroit United Railway has received permission from the City Council to build two new street car lines in the west end of the city. One of the new routes will be a continuation of the Junction Avenue line and will run north on Epworth Boulevard to Dailey Avenue, Dailey and Highfield Avenues to Grand River Avenue, connecting with the line on that street. The other route is an extension out Linwood Avenue to the Joy Road. It is likely that this line will be connected with the Trumbull line. It is expected that work will be started on these extensions in a very short time. The extension of the Hamilton line to the Six Mile Road through Highland Park village is nearly completed, and it is expected that service over this extension will be begun within a month. The company is also extending the tracks on West Warren Avenue. Construction work to permit a general re-routing of cars in the center of the city is nearly completed.

**Brooklyn, N. Y.**—The Brooklyn Rapid Transit Company has asked the Board of Estimate and Public Service Commission for permission to abandon the Long Island Traction Company franchise for a line over the Springfield Road to Hollis Avenue, thence along that avenue into the old village of Jamaica, with a terminus at Twombley Place and Beaver Street.

**Dayton, Ohio.**—The Peoples Railway has asked the County Commissioners for permission to extend its tracks on North Main Street outside the city corporation line. The petition states that a loop will be built at the end of the extension.

**Youngstown, Ohio.**—The Mahoning & Shenango Railway & Light Company has notified the City Council of Youngstown that it will accept the franchise granting it the right to extend the Mahoning Avenue line to Perkins Corners. This franchise has twice been refused by the company within the past few months. If the franchise is granted, work on the extension will be begun immediately.

## TRACK AND ROADWAY

**Little Rock Railway & Electric Company, Little Rock, Ark.**—The tentative plans of the Little Rock Railway & Electric Company to extend its lines to the cantonment site of the Twelfth National Army north of Fort Logan H. Roots have been abandoned, owing to the inability of the company to secure steel rails. The transportation of troops to and from the camp will be cared for by the Iron Mountain Railroad.

**Darwin, Cal.**—A communication from the Darwin Development Company states that construction on the proposed electric railway along the south shore of Owens Lake, to connect with the Southern Pacific Company at Olancha, has been postponed indefinitely, owing to the high cost of materials. [April 21, '17.]

**Fresno (Cal.) Interurban Railway.**—This company reports that within a few months it expects to construct a 6-mile line to Centerville and Kings River head gates.

**Pacific Gas & Electric Company, Sacramento, Cal.**—This company is double-tracking its line on H Street, from Nineteenth Street to McKinley Park.

**Georgia Railway & Power Company, Atlanta, Ga.**—This company will construct a 3-mile extension to the army cantonment at Silver Lake.

**Alton & Eastern Electric Railway, Alton, Ill.**—A contract has been awarded by the Alton & Eastern Electric Railway to Mulvill Brothers, Alton, for the construction of a line from Alton to the State Hospital. L. C. Haynes, East St. Louis, president. [April 10, '15.]

**East St. Louis & Suburban Railroad, East St. Louis, Ill.**—This company is reconstructing its tracks on Missouri Avenue between Collinsville Avenue and Third Street.

**Galesburg Railway, Lighting & Power Company, Galesburg, Ill.**—This company is securing the necessary right-of-way for an extension to Knoxville. The company is also ready to install rails on its North Seminary Avenue line.

**Galesburg & Kewanee Electric Railway, Kewanee, Ill.**—This company expects to lay new rails over that portion of its right-of-way which is to be paved this summer. New tracks are being laid by the company on Commercial Street from Park Street to the city limits.

**Springfield (Ill.) Consolidated Railway.**—This company has received permission from the Public Utilities Commission of Illinois to extend its transmission line over the tracks of the Chicago, Peoria & St. Louis Railroad in Sangamon Avenue to Eleventh Street.

**Indianapolis Traction & Terminal Company, Indianapolis, Ind.**—This company will construct an extension on Brookside Avenue from Eighteenth Street to Olney Avenue.

**Muscatine, Burlington & Southern Railway, Muscatine, Iowa.**—Tentative plans for the electrification of the Muscatine, Burlington & Southern Railway were outlined at a recent meeting of the officers and directors of the road. Plans were also made for the complete rehabilitation of the road at an expense of approximately $200,000, exclusive of the electrification. The road is more than 50 miles long.

**Washington, Baltimore & Annapolis Electric Railway, Baltimore, Md.**—This company has awarded a contract to H. S. Kerbaugh, Inc., Baltimore, for the construction of tracks in connection with the new army cantonment at Annapolis Junction.

**Detroit (Mich.) United Railway.**—This company has completed a new bridge over the Clinton River at Macomb Street, Mt. Clemens, and the Shore Line cars are now operating from Detroit to Mt. Clemens over the bridge.

**Duluth (Minn.) Street Railway.**—Work has been begun by the Duluth Street Railway double-tracking its East End car line from the Northern Pacific Railroad crossing to Robertson Avenue, Superior. Work will be begun about Aug. 1 on the construction of an extension from Duluth to New Duluth, and it is expected that the line will be built and in operation by Dec. 31.

**Helena Light & Railway Company, Helena, Mont.**—This company is working on a program of extensive improvements for its suburban lines, which it is hoped to complete before the State Fair opens on Sept. 24. The company is laying 110 lb. rails on Helena Avenue from North Main Street to the Northern Pacific Railroad station. New ties are to be placed under the 70 lb. rails on the Lower Broadwater line, North Park Avenue, between Lawrence and Placer. The upper Broadwater line is also to be overhauled by putting in new ties and 70 lb. rails on Harrison Avenue. Later the line from Harrison Avenue and Knight Street to Broadwater will be improved by removing the old ties and taking out some of the kinks in the tracks.

**Claremont Railway & Lighting Company, Claremont, N. H.**—This company reports that it will reconstruct its entire track in Claremont, material for which has been purchased.

**City Electric Company, Albuquerque, N. Mex.**—This company is installing a new electric feed system on its University line.

**New York Municipal Railway, Brooklyn, N. Y.**—Bids were opened by the Public Service Commission for the First District of New York on July 5 for the construction of Route No. 49, Section 3, the Culver Rapid Transit Railroad in Brooklyn, from a point near Avenue X to Sheepshead Bay Road. The lowest bidder was Oscar Daniels & Company, New York, at $84,600.

**Long Island Railroad, New York, N. Y.**—This company has ordered from the General Railway Signal Company an electro-mechanical interlocking machine with sixteen electrical levers and seven mechanical levers, to be installed at Manhattan Beach Junction.

**Cincinnati (Ohio) Traction Company.**—The street railway committee of the City Council has decided to recommend the extension of the Warsaw Avenue line of the Cincinnati Traction Company to Covedale; the Sixth Street line over the Hopple Street viaduct, and the McMickin-Main line to Dixmyth Avenue. Consideration of other extensions was postponed at a recent meeting because of the absence of representatives of the company.

**Columbus, Delaware & Marion Electric Company, Columbus, Ohio.**—Improvements to the amount of $500,000 will soon be made by the Columbus, Delaware & Marion Electric Company which recently took over the Columbus, Delaware & Marion Railway. The plan of capitalization of the new company was noted last week.

**Springfield (Ohio) Railway.**—Work has been begun by the Springfield Railway on the construction of an extension from the North Limestone Street lines over Chestnut Avenue, Mason Street, Sherman Avenue and Olive Street, and it is expected that the line will be completed in about two months.

**Mahoning & Shenango Railway & Light Company, Youngstown, Ohio.**—Work has been begun by the Mahoning & Shenango Railway & Light Company on its 3-mile line covering the eastern section of the city and to Buhl Farm.

**Oklahoma Union Railway, Tulsa, Okla.**—A contract has been awarded by the Oklahoma Union Railway to the Topeka Bridge & Iron Company, Topeka, Kan., for the construction of all bridges to be built on its line between Tulsa and Sapulpa. Four bridges and one viaduct were included in the contract. All bridges will be of the monolithic arch type and will be constructed of reinforced concrete.

**London (Ont.) Street Railway.**—It is reported that the London Street Railway has agreed to construct a second track on Richmond Street if the city would widen the street about 3 or 4 ft.

**Bloomsburg, Millville & Northern Railway, Bloomsburg, Pa.**—William P. Zehner, secretary of the Bloomsburg, Millville & Northern Railway, reports that the company has decided not to construct its proposed line at this time and will sell the right-of-way.

**Philadelphia, Pa.**—Sealed proposals will be received by the Department of City Transit, Philadelphia, William S. Twining, director, until July 24 for concrete track floor, cast iron floor drains and reinforced concrete slab footwalks from Callowhill Street to Indiana Street, about 15,630 linear feet, and from Indiana Street to Dyre Street, about 15,000 linear feet.

**Rhode Island Company, Providence, R. I.**—Plans have been completed by the Rhode Island Company for testing all rail bonds on the 400 miles of track in Providence. The work is to be done under the direction of Prof. Albert S. Richey of Worcester Polytechnic Institute, and will be begun at once.

**Regina (Sask.) Municipal Railway.**—The City Commissioners of Regina have under consideration the construction of an additional half mile of track on Pasqua Street, in order to convert the red and blue lines into a belt line. It is estimated that the cost of the line would be about $12,000. The construction of second track on Elphinstone Street to the exhibition grounds is also under consideration by the company.

**Northern Texas Traction Company, Fort Worth, Tex.**—The City Commission of Dallas has ordered the Northern Texas Traction Company to lay 103-lb. rails on wood or concrete ties with a solid concrete sub-base on Jefferson Street from Lancaster to Polk Avenues, 2 miles, preparatory to the repaving of this street.

***Freeport, Tex.**—It is reported that surveys are being made by the Freeport Sulphur Company for an electric railway from Freeport to Houston, about 100 miles. W. A. Randle, engineer in charge.

**Houston (Tex.) Electric Company.**—Plans are being considered by the Houston Electric Company for the construction of an extension of the Brunner Street car line to the proposed camp site at the city limits of Houston.

**San Antonio (Tex.) Traction Company.**—Announcement has been made by W. B. Tuttle, vice-president of the San Antonio Traction Company, that work will be begun on the proposed line to Camp Kelly, the aviation post, as soon as the City Commission grants permission for the transfer of the franchises of the San Antonio Traction Company and the San Antonio Gas & Electric Company to a new corporation to be known as the San Antonio Electric Company.

**Tacoma, Wash.**—Bids have been asked by the City of Tacoma for the construction of 10,000 ft. of track in the extension of its line to the Todd shipyards. The work will involve the construction of a ½-mile viaduct over the yards of the Chicago, Milwaukee & St. Paul Railway and a 600-ft. trestle over Hylebos Creek waterway. The estimated total cost is $180,000.

**Wisconsin Interurban System, Madison, Wis.**—The Wisconsin Railroad Commission has granted the Wisconsin Interurban System permission to issue $600,000 in bonds, the proceeds of which will be used to pay indebtedness incurred in building street railway in Portage and Madison and the remainder to be used for construction purposes. The company is building an electric railway between Madison and Portage and Madison and Janesville, Wis. J. E. Jones of Madison is president. [Nov. 11, '16.]

## SHOPS AND BUILDINGS

**Moncton Tramways, Electric & Gas Company, Ltd., Moncton, N. B.**—This company has completed a new machine shop, containing motor-driven lathes, drill presses and grinders.

**Johnstown (Pa.) Traction Company.**—Work will be begun at once by this company on the construction of a temporary carhouse in Coopersdale for the purpose of keeping a number of cars in the lower section of the city while the Walnut Street bridge is being erected.

**Philadelphia, Pa.**—Bids opened for the construction of ten stations on the Frankford Elevated line by Director Twining of the Department of City Transit on July 10 were so far above the estimates upon which the department had based its appropriations for the cost of the work that the bids were discarded. Hence new estimates will have to be made and bids readvertised. There were but two bidders for the construction of the ten buildings, and the higher of these bids was $550,000 and the lower $510,000. Bids for the electrical and plumbing installations were well within the department's estimates but were invalidated by the necessity of drawing up entirely new specifications.

## POWER HOUSES AND SUBSTATIONS

**Fort Wayne & Northern Indiana Traction Company, Fort Wayne, Ind.**—This company has awarded a contract to the Engineering Company, Fort Wayne, for the steel extension to be built to its power house.

**United Railways & Electric Company, Baltimore, Md.**—Bids have been asked by the United Railways & Electric Company for stokers for its Pratt Street power house.

**International Railway, Buffalo, N. Y.**—The City Council of Niagara Falls has granted the International Railway permission to place overhead transmission cables along Twenty-fourth Street to its new substation.

**Tacoma Railway & Power Company, Tacoma, Wash.**—A portable substation, including complete equipment, will be installed immediately by the Tacoma Railway & Power Company to increase the power service on the company's line to American Lake. The station will be mounted on a flat car.

**Waupaca Electric Service & Railway Company, Waupaca, Wis.**—This company is making improvements to its electric power system in Waupaca. A new 225-hp. electric generator will soon be installed and placed in operation. The system will also be changed to 60 cycle.

# Manufactures and Markets

Discussions of Market and Trade Conditions for the Manufacturer, Salesman and Purchasing Agent

Rolling Stock Purchases Market Quotations Business Announcements

## One-Man Cars Increasingly Popular

### ar Orders in General During First Half of 1917 Show Slight Decline as Compared with 1916, but Better than in 1915—Manufacturers Hopeful

Conditions change so rapidly these days that estimates of he future need frequent revision. This is especially true n the electric railway field and particularly in its car-esigning and manufacturing divisions. Once each year the LECTRIC RAILWAY JOURNAL, in its first issue of January, resents authoritative statistics of the number and types of ars and locomotives ordered during the previous year. The ecords shown for the business of 1916 were of particular nterest because of the generally unsettled state of affairs n the transportation and manufacturing industry. It had een difficult during the year to gage the trend of business nd it was interesting as well as reassuring to find that the lectric railways had ordered 1200 more cars in 1916 than hey did in 1915. Yet the total of 3942 cars for 1916 was mall in comparison with the totals of earlier years.

### ESTIMATES FOR 1917 LARGE

Based on the information available at the beginning of his year, a survey of the opinions of men in important ositions in the electric railway car-manufacturing and car-perating divisions of the industry confirmed a view freuently expressed in conversation—that car orders for the rst half of 1917 would considerably exceed those for either alf of 1916. But now that the first half of 1917 has been ompleted and the records are available, it is found that the stimates have not been met.

The manufacturer is interested to learn just how many rs have been ordered; first, because the status of the car-uilding business very clearly reflects the status of the elecic railway industry, and second, because the figures for e first half of the year will afford a little firmer foundaon on which to base calculations for the second half of is year—a year which is displaying much complexity for l manufacturers.

### CARS ORDERED FIRST HALF OF 1917

Here are the figures showing a comparison of the cars dered for the first six months of this year and for the me periods in 1915 and 1916. These figures include the rs ordered by electric railway companies in the United tates and Canada:

| | First Six Months | Full Year |
|---|---|---|
| 15 | 1,273 | 2,782 |
| 16 | 2,224 | 3,942 |
| 17 | 1,943 | .... |

It is noted that the deficiency for the first half of 1917 281 cars as compared with the same period for 1916. No ubt a later and more extended census of just what cars e being built in company shops will serve to increase the tal number of cars, but the statement may safely be made at 12 per cent fewer cars were ordered from manufacrers and company shops during the first half of 1917 than ere ordered duing the first half of 1916.

The largest car order placed this year was that of the terborough Rapid Transit Company for 377 steel motor rs and 140 steel trail cars for the dual subway system. e total amount of this order, including motor and con-ol equipment and brakes, was reported as $4,390,000. Had not been for this order the total number of cars ordered the Eastern roads since Jan. 1 would have been the small ure of 437.

Other orders of size in the Eastern states were 100 cars r the Public Service Railway, 100 Peter Witt type cars r the International Railway Company of Buffalo, 107 uble-truck city and interurban cars for Hodenpyl, Hardy & Company, and the Stone & Webster order for 159 one-man safety cars. The latter two orders, however, were for distribution to properties in the Central, Southern and Pacific Coast states.

In the Middle states the number of cars ordered as compared with 1916 was proportionately less than in the East, and it should also be noted that of the 580 cars ordered by the roads in the Middle states since Jan. 1, fully 250 were freight cars.

The quota of cars ordered for Western properties was largely filled by the Stone & Webster one-man safety-car order earlier mentioned. In Canada the records show that but fourteen cars were ordered in addition to the fifty motors and fifty trail cars for the Montreal Tramways.

The figures for the first half of 1917 and 1916 presented by geographical divisions, also are informative:

ROLLING STOCK PURCHASES

| | First Six Months 1916 | First Six Months 1917 | Increase or Decrease | Number of Companies Placing Orders, for First Half of 1916 | 1917 |
|---|---|---|---|---|---|
| Eastern states | 1,257 | 954 | —303 | 44 | 21 |
| Middle states | 805 | 580 | —225 | 41 | 31 |
| Western states | 49 | 145 | +96 | 5 | 10 |
| Southern states | 88 | 150 | +62 | 14 | 16 |
| Canada | 25 | 114 | +89 | 3 | 4 |
| Totals | 2,224 | 1,943 | —281 | 107 | 82 |

These figures show that notwithstanding the business activities of the industrial centers, the roads in the Eastern and Middle states as a group have not been able to buy cars this year, even to the number purchased last year, and that the bulk of the orders have come from the big city properties.

### THE FASHIONS ARE CHANGING

In reviewing the orders placed so far this year there is noted a substantial increase in the number of light safety one-man cars. While not a great many cars have been ordered for city properties in the Central and Western states, yet it is apparent that lightness and safety have at last been fully recognized by small as well as large roads. The Stone & Webster properties have been the largest buyers so far of the small, light, safety units. The single order for 159 of these cars, which will be of the Birney standardized design, will be distributed among properties located in Atlantic, Pacific and Gulf states. The Illinois Traction System also ordered about fifty of these "little fellows" of its Bosenbury type, and practically all of the properties in the Mississippi Valley which ordered cars have adopted some type of light, safety one-man unit.

A notable increase in the number of freight cars ordered is apparent in reviewing the rolling-stock statistics for the first half of the year. This, of course, is to be expected because of the general demand for freight service in all parts of the country. The largest order for standard M. C. B. freight cars was placed by the Illinois Traction System for 200 M. C. B. type cars, about half of which are for coal traffic.

### THE SALES ACTIVITIES

From the first of January until the middle of April, after war had been declared, the rate at which cars were being ordered was in excess of that for several years previous. Since then rolling-stock news has been comparatively meager, so it now seems safe to say that, all other factors considered, the declaration of war and its shroud of doubt were the reasons for the number of car orders placed falling below the well-considered estimates made at the start of this year. In other words, the industry began to order cars in a fairly active way, notwithstanding the especially high prices, and continued to do this until the declaration of war upset financial plans. Had the business continued as it was running for the first three months of the year, it is fair to state that the number of cars placed during 1917 would have exceeded the record for several years past.

Part of the present inactivity, of course, is chargeable to summer, a season of slackness in car ordering, even in normal years. Most of the car builders in the electric railway field have accumulated such stocks of raw materials that they are safe in promising to deliver cars as soon as a railway can obtain the electrical equipment, and they are hopeful that more revenue from the properties will shortly evidence itself in inquiries for more cars.

## Car Manufacturers Join Forces

### Prominent Companies Form Association for Mutual Benefit of Members and Railways

The Railway Car Manufacturers' Association, whose organization has recently been completed, consists of sixteen car builders. Together they have a capacity for building more than 250,000 cars per annum, a capacity much in excess of the business done during recent years. The purposes of the association are co-operative and educational. Specifically they are: In all lawful ways and by all lawful methods to promote the interests of the car-building industry and to procure, to the fullest possible extent, economical results beneficial to its members and to the purchasers of their products; to foster and promote a spirit of co-operation between its members with respect to safety and welfare work; to afford a means and method for ready interchange of views concerning matters affecting the car-building industry, the interests of the individuals and concerns engaged therein and of the purchasers of their products and of allied industries, and for a full discussion of all such matters; to secure and preserve equitable conditions in the workshops of its members, with a view to the improvement of shop conditions and the proper protection of the interests of both employer and employee; to co-operate with railroads and other consumers of the products of the members of this association and with allied industries, for the purpose of bringing about a standardization of designs and specifications, and a uniformity of methods of inspection and purchasing.

The association, of which Dr. W. F. M. Goss is president, has recently opened offices at 61 Broadway, New York City. Dr. Goss is well known in the fields of steam railroading, mechanical engineering and education, to each of which he has made many notable contributions. He became identified with Purdue University in 1879 and, as dean of engineering and director of the engineering laboratories, co-operated with the steam railroads in making tests of locomotives and parts of railroad equipment. In 1907 he went to the University of Illinois as dean of the engineering schools, and while there was instrumental in establishing the department of railway electrical engineering. In 1915 he was engaged as chief engineer by the Chicago Association of Commerce to prepare a report on smoke abatement and railway terminal electrification in Chicago. He has served as president of the A. S. M. E. and has held important offices in many technical societies.

The manufacturers which are members of the association are as follows: American Car & Foundry Company, Barney & Smith Car Company, Bettendorf Company, J. G. Brill Company, Haskell & Barker Car Company, Harlan & Hollingsworth Corporation, Keith Car & Manufacturing Company, Laconia Car Company, Mount Vernon Car Company, Osgood-Bradley Car Company, Pressed Steel Car Company, Pullman Company, Ralston Steel Car Company, St. Louis Car Company, and Standard Steel Car Company.

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Copper production for the month of June has been estimated at 200,000,000 lb. This is the largest amount produced since December, 1916, when the same amount was refined. The lowest yield for any month of the first half of 1917 was for March, when only 150,000,000 lb. were refined. Delays in the delivery of equipment have made it impossible to increase the refining capacity to 225,000,000 lb. monthly as was planned. Inefficiency of labor, strikes, etc., have been important factors preventing the refineries from getting the best that was in their existing capacity.

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## Why the Detroit United Railway Delays Track Work

### Statements Show Patrons the Rail Delivery Situati as It Now Confronts the Electric Railway— Government Needs Must Be Met First

Someone in Detroit who was unacquainted with th present industrial situation publicly stated that this roa could secure track steel, yet held off doing so. The frankness of the following answer is commended. The lette quoted will also interest intending purchasers of like mat rial and possibly will find sympathetic readers among oth manufacturers.

#### Deliveries Yet to Be Made on Orders Entered in January, 1916

The company's statement of delivery conditions follow

"We have not received a single pound of the 5000 tons T-rail ordered by us in January, 1916, for use on our inte urban lines. The deep girder rail used in paved streets i however, even more difficult to get. This rail is used only b street railways in paved streets. The aggregate quantit used throughout the country is, of course, small compare with the enormous tonnage of steel manufactured for othe purposes. In consequence, the mills are unwilling to inte rupt their larger business for the purpose of manufacturin a comparatively small tonnage of this type of rail. The have yet to fill our order for this rail placed in April, 191 and, of course, have not filled orders which were placed later dates.

"We quote from a letter received from one of the mill which was written to us in reply to urgent pleadings that ra be delivered to us: 'The mill situation is getting worse an is likely to be deplorable before midsummer. The demand of the United States government take about two days week, and this week they are taking all the time. Whe government orders require two days out of every six, and al the days every third week, there is not much chance to catc up or keep up with orders. While I and our people want t do all we can for you, the demands of the United States government are imperative and are likely to upset everything.

"Apparently there is a great scarcity of steel. The United States Steel Corporation reports unfilled orders of 11,383,287 tons as of June 30, and that orders for millions tons of new business are being refused. We have schedule for completion this year many replacements and new job that require the deep girder rail. Our endeavor, of cours is to carry on our work in connection with the city's work to the end that the public may be least inconvenience However impatient we may all be, all of the work cannot b accomplished at one time. It must be carried on in an o derly manner.

"Since the foregoing was received the steel mill sent second letter reading as follows:

" 'We quote as follows: 350 tons of rail section 114-480, i lengths of 30 ft. and 33 ft., as standard, price $79.20 pe gross ton f.o.b. mill with freight prepaid to Detroit, Mich we to have privilege of shipping not to exceed 10 per cen of second-quality rail at a reduction in price of $2 per to The above quotation is made for immediate acceptance an under the following stipulation, viz.: This quotation is subject to the acts, demands or requests of the United State government and is made with the express understandin that shipment will be from the first convenient rolling du ing 1918. Both buyers and sellers reserve the privilege cancellation of this order in case the sellers shall notify th buyers prior to July 1, 1918, that they will be unable to mak shipment during the remainder of 1918.

" 'Regarding this stipulation it is necessary for us to mak it in all future contracts as the requirements of the Unite States government may be such as to prevent the rolling any girder rails beyond those already contracted for, f shipment this and next year, and may interfere with t shipment of existing orders. It may be that you will wa us to enter the order on the basis as above outlined in ord to obtain such preference in rolling as we may be able give, based upon the natural priority which will be accord in the chronological order of the dates of contracts place If this is satisfactory please wire us immediately.' "

## Exports Board Appointed

The exports board consisting of five members from various United States departments whose duties will be to control the exports question under the general instructions of the administration, has been named. E. N. Hurley, former chairman of the Federal Trade Commission, will head the board as the representative of the Department of Commerce. Dr. Alonzo E. Taylor will represent the Department of Agriculture, John B. White the food administrator, and Vance McCormick, chairman of the Democratic National Committee, the Department of State. E. E. Pratt, chief of the Bureau of Foreign and Domestic Commerce, will act as secretary to the board and the council.

## NEW YORK METAL MARKET PRICES

| | July 5 | July 12 |
|---|---|---|
| Prime Lake, cents per lb | 31¾ | 30¾ |
| Electrolytic, cents per lb | 31¾ | 30¾ |
| Copper wire base, cents per lb | 36 | 36 |
| Lead, cents per lb | 11⅜ | 11⅛ |
| Nickel, cents per lb | 50 | 50 |
| Spelter, cents per lb | 9¼ | 9⅛ |
| Tin, Straits, cents per lb | 62 | 63 |
| Aluminum, 98 to 99 per cent, cents per lb | 59 | 58 |

## OLD METAL PRICES

| | July 5 | July 12 |
|---|---|---|
| Heavy copper, cents per lb | 28 | 27 |
| Light copper, cents per lb | 25 | 24½ |
| Red brass, cents per lb | 20 | 20 |
| Yellow brass, cents per lb | 18 | 18 |
| Lead, heavy, cents per lb | 8¾ | 9¼ |
| Zinc, cents per lb | 7¼ | 7 |
| Steel car axles, Chicago, per net ton | $50.00 | $50.00 |
| Old car wheels, Chicago, per gross ton | $39.00 | $38.00 |
| Steel rails (scrap), Chicago, per gross ton | $49.50 | $48.00 |
| Steel rails (relaying), Chicago, per gross ton | $59.50 | $59.50 |
| Machine shop turnings, Chicago, per net ton | $19.50 | $20.00 |

## CURRENT PRICES FOR MATERIALS

| | July 5 | July 12 |
|---|---|---|
| Rubber-covered wire base, New York, cents per lb. | 36½ | 36½ |
| No. 0000 feeder cable (bare), New York, cents per lb. | 36½ | 36½ |
| No. 0000 feeder cable stranded, New York, cents per lb. | 33¾ | 33¾ |
| o. 6 copper wire (insulated), New York, cents per lb. | 33 | 33 |
| o. 6 copper wire (bare), New York, cents per lb. | 36 | 36 |
| ails, heavy, Bessemer Pittsburgh | $38.00 | $38.00 |
| ails, heavy, O. H., Pittsburgh, per gross ton | $40.00 | $40.00 |
| Wire nails, Pittsburgh, per 100 lb | $4.00 | $4.00 |
| ailroad spikes, 9/16 in., Pittsburgh, per 100 lb. | $5.00 | $5.00 |
| teel bars, Pittsburgh, per 100 lb | $4.50 | $5.00 |
| heet iron, black (24 gage), Pittsburgh, per 100 lb. | $8.40 | $8.35 |
| heet iron, galvanized (24 gage), Pittsburgh, per 100 lb. | $9.55 | $9.55 |
| -beams over 15 in., Pittsburgh, cents per lb | 10 | 10 |
| alvanized barbed wire, Pittsburgh, cents per lb. | $4.85 | $4.85 |
| alvanized wire, ordinary, Pittsburgh, cents per lb. | $4.65 | $4.65 |
| ement (carload lots), New York, per bbl | $2.22 | $2.22 |
| ement (carload lots), Chicago, per bbl | $2.31 | $2.31 |
| ement (carload lots), Seattle, per bbl | $2.60 | $2.60 |
| inseed oil (raw, 5 bbl. lots), New York, per gal. | $1.16 | $1.13 |
| inseed oil (boiled, 5 bbl. lots), New York, per gal. | $1.17 | $1.14 |
| White lead (100 lb. keg), New York, cents per lb. | 12¾ | 12¾ |
| urpentine (bbl. lots), New York, cents per gal. | 42½ | 41½ |

## ROLLING STOCK

**City of Tacoma, Wash.**, is in the market for four motor rs, six trail cars and one freight locomotive.

**Philadelphia (Pa.) Rapid Transit Company** is reported to e in the market for forty city cars.

**St. Petersburg & Gulf Railway, St. Petersburg, Fla.**, is eported to have placed an order for six city cars with he J. G. Brill Company.

**Toronto (Can.) Suburban Street Railway** has purchased hree semi-convertible pay-as-you-enter cars from the Tus-aloosa (Ala.) Street Railway. It has also purchased an xpress car and a snowplow.

**London (Ont.) Street Railway** has ordered five single-uck single-end pay-as-you-enter cars. These cars will cost out $6,500 each, as compared to $4,500 each paid for milar cars in 1913.

**Columbus (Ga.) Railroad** on June 16 placed in service on s lines a one-man pay-as-you-enter safety car similar to e eight single-truck safety cars recently ordered by the mpany from the American Car Company.

**Eastern Wisconsin Electric Company, Oshkosh, Wis.**, has greed to buy ten new city cars, two interurban cars, a snowplow and other equipment provided the city will grant the elimination of certain unproductive track. The company proposes to spend about $250,000.

**Washington, Baltimore & Annapolis Electric Railroad, Baltimore, Md.**, is reported to have placed an order for eight motor cars and to be in the market for 100 day coaches for handling troop movements in and out of the government's camp at Annapolis Junction, Md.

**Public Utilities Company, Evansville, Ind.**, has specified the following details for ten vestibuled pay-within cars being built for it by the St. Louis Car Company:

| | |
|---|---|
| Number | 10 |
| Builder | St. Louis Car |
| Type | Pay-within |
| Seating capacity | 40 |
| Weight (total) | 36,840 |
| Truck centers, length | 19 ft. 0 in. |
| Over bumpers | 41 ft. 4 in. |
| Over vestibules | 40 ft. 4 in. |
| Over posts | 8 ft. 2 in. |
| Floor to ceiling | 7 ft. 6 in. |
| Sill to trolley base | 8 ft. 5¼ in. |
| Body | Steel sides with wooden superstructure |
| Interior trim | Honduras mahogany |
| Headlining | 3/16-in. Agasote |
| Roof | Turtle deck |
| Underframe | Steel |
| Air brakes | Westinghouse |
| Axles | St. Louis Car |
| Bumpers | Rico anti-climbers |
| Car trimmings | Bronze, St. Louis Car |
| Cables | St. Louis Car |
| Conduits | St. Louis Car |
| Control | Westinghouse K-36 J. |
| Couplers | St. Louis Car |
| Curtain fixtures | Forsyth No. 88 |
| Curtain material | Pantasote No. 77 |
| Designation signs | Ill. E. S. S. mechanism |
| Door mechanism | Hand-operated |
| Fenders | Ry. Co.'s design |
| Gongs | 12-in. bronze pneumatic |
| Hand brakes | Ackley |
| Hand straps | Rico sanitary |
| Heaters | Peter Smith, No. P-12 |
| Headlights | Crouse-Hinds |
| Journal boxes | St. Louis Car |
| Lightning arresters | West. |
| Motors | West. 532-B outside hung |
| Paint | Murphy ABC |
| Register | International R-5 |
| Sand box | With Reliance trap valve |
| Sash fixtures | OMEdwards |
| Seats | Hale & Kilburn |
| Seating material | Rattan |
| Springs | Pittsburgh steel spring |
| Step treads | Mason |
| Trucks | St. Louis Car 106-A max. traction |
| Ventilators | Automatic |
| Wheels | 33 driver, 21 in. pony, cast-iron |
| Special devices | Faraday buzzers |

**United Railways & Electric Company, Baltimore, Md.**, noted in the June 2 issue as ordering eighty semi-convertible double-truck pay-as-you-enter cars from The J. G. Brill Company, has specified the following details for this equipment.

| | |
|---|---|
| Number of cars ordered | 80 |
| Date of order | May 16 |
| Date of delivery | Oct. 1 |
| Builder | J. G. Brill |
| Type | Semi-convertible |
| Seating capacity | 52 |
| Weight (total) | 44,000 lb. |
| Bolster centers | 21 ft. 6 in. |
| Over bumpers | 46 ft. 7 in. |
| Over vestbule | 44 ft. 11 in. |
| Width over all | 8 ft. 4½ in. |
| Rail to trolley base | 11 ft. 9 in. |
| Body | Semi-steel |
| Interior trim | Natural Cherry |
| Headlining | Agasote |
| Roof | Monitor |
| Air brakes | Westinghouse |
| Axles | Carnegie—heat treated |
| Bumpers | Brill |
| Car trimmings | Brill |
| Conduits | Ry. standard |
| Control, type | K-35-U-2 |
| Couplers | Brill |
| Curtain fixtures | Curtain Supply & National Lock Washer |
| Curtain material | Pantasote |
| Designation signs, | Hunter (4 per car) |
| Door mechanism | Manual |
| Fare boxes | Johnson |
| Wheelguards | HB. Automatic |
| Gears and pinions | GE grade M |
| Hand brakes | Ackley adjustable |
| Heaters | Peter Smith electric |
| Headlights | Dayton Mfg. Co. |
| Journal boxes | Brill |
| Lightning arresters, | GE aluminum cells |
| Motors | 4 GE-200-I, outside hung |
| Paint | Paint and varnish |
| Registers | International R.-7 |
| Sanders | Brill |
| Sash fixtures | Brill |
| Seats | Brill |
| Seating material | Cane |
| Springs | Brill |
| Step treads | Universal Safety |
| Trolley catchers | None |
| Trolley base | U. S. No. 6 |
| Trolley wheels or shoes, | Kalamazoo No. 5 |
| Trucks | Brill 27 GE-1 |
| Ventilators | Hinged |
| Wheels | 33 in. cast iron |

## TRADE NOTES

**J. P. Moore** of the railway sales department of the Westinghouse Electric & Manufacturing Company, has been transferred to the Cleveland, Ohio, sales office.

**Gordon M. Campbell**, manufacturing engineer General Electric Company, West Lynn, Mass., has joined the Kerr Turbine Company, Wellsville, N. Y., as works manager.

**Bridgeport (Conn.) Brass Company** announces the removal of its New York office to suite 2236, Woolworth Building, 233 Broadway, where larger quarters have been secured.

**T. A. Wharton** has been appointed by the Barrett Company, New York City, as representative of the railway sales department for the Cincinnati branch, with headquarters at 527 Carr Street, Cincinnati.

**Driver-Harris Company, Harrison, N. J.**, announces that all departments will be shut down for one week beginning June 30. This action was taken to provide for necessary repairs in equipment and to give employees an opportunity to recuperate after a long, hard drive. During the week the plant is shut down a skeleton organization only will be maintained.

**A. A. Gray** and **C. L. Benjamin** have formed a company to act as advertising counsel to manufacturers of electrical, mechanical, chemical and other products, with offices at 608 South Dearborn Street, Chicago. Mr. Benjamin was for nine years advertising manager of the Cutler-Hammer Company, Milwaukee, Wis., and Mr. Gray is widely known as the former managing editor of the *Electrical Review and Western Electrician.*

**Safety Car Devices Company, St. Louis, Mo.,** announces the following recent sales of its safety car brake equipments with complete safety control features: Northern Pennsylvania Traction Company, Meadville, Pa., six sets of equipments, Pittsburgh County Railway, McAlester, Okla., six; Puget Sound International Railway & Power Company, twelve; Columbus (Ga.) Railroad, eight; Tulsa (Okla.) Street Railway, six; Cedar Rapids & Marion Street Railway, Cedar Rapids, Iowa, twenty; the Mason City & Clear Lake Railroad, Mason City, Iowa, seven, and fourteen sets for two Stone & Webster properties.

**Combustion Engineering Company, New York, N. Y.,** in line with the President's proclamation relative to the patriotic duty of all power plant operators to conserve fuel, has assigned one of its efficiency engineers to travel throughout the country until further notice and interview chief engineers and owners of such plants, with a view to reducing the fuel costs by increasing efficiency in every way possible, not only in so far as the stoker is concerned, but in helpful suggestions for minor improvements and changes which a great many plants can perfect with but small expense and trouble when such matters are brought to their attention. It has been estimated that $600,000,000 is the annual fuel loss through inefficiency in power plants in the United States, and it is the purpose of this corporation to give its full measure of co-operation to accomplishing results in cutting down this enormous waste.

## NEW ADVERTISING LITERATURE

**Wagner Electric Manufacturing Company, St. Louis, Mo.:** A book, "Motor Installations," illustrating Wagner motors in different industries.

**Greenfield Tap & Die Corporation, Greenfield, Mass.:** A booklet describing the "Acorn" die. Contains tables of sizes and prices of dies and holders.

**Western Fire Appliance Works, Chicago, Ill.:** Folder of its Zeleny thermometer system for indicating changes of temperature in grain in storage.

**Reynolds Electric Company, Chicago, Ill.:** A booklet, describes and gives table and prices of its color hoods and flashers, also illustrations of electrical displays.

**Link Belt Company, Chicago, Ill.:** A booklet, "The Ideal Drive for Textile Machinery," descriptive and illustrative of the Link Belt silent chain drive.

**National X-Ray Reflector Company, New York, N. Y.:** Catalog No. 20 on the use of X-ray reflectors for show windows, floodlighting, industrial and other direct lighting.

**Holophane Glass Company, New York, N. Y.:** A booklet showing the use of Holophane units with type C lamps. Charts and data for designing installations are given.

**Westinghouse Electric & Manufacturing Company, East Pittsburgh, Pa.:** Catalog 3A, supplement 1. Describes an improved form of recording-demand watt-hour meter.

**National Metal Molding Company, Pittsburgh, Pa.,** Bulletin No. 201 on this company's "Flexsteel" products, including armored cable, lamp, cord and flexible metallic conduit couplings and fittings.

**Richardson Scale Company, Passaic, N. J.:** Bulletin No. 101, descriptive of the construction, operation and advantages of this company's automatic coal scale and also its automatic liquid scale.

**Arthur Power-Saving Recorder Company, New Haven, Conn.:** Illustrated bulletin on reducing coal, power and maintenance bills, discussing methods of car operation to minimize energy consumption.

**Reliance Electric & Engineering Company, Cleveland, Ohio:** Bulletin 2014 describing the different mechanical and electrical details of this company's type T heavy-duty "Reliance" motors for direct current.

**H. M. Byllesby & Company, Chicago, Ill.:** A booklet, "Back of the Investment," containing information about the Northern States Power Company and its properties in 1916. This edition is larger and more attractively designed than the first edition, contains many new photographs and in all respects brings the data up to date.

## New Publications

**Municipal Ownership Fails in U. S. A.— By James B. Wootan.** H. I. Gonden, People's Gas Building, Chicago, Ill. Thirty-two pages. Paper, 25 cents.

This booklet contains a list of more than 200 municipal ownership failures—economic failures in all cases and physical also in many cases. Politics, it is said, has been the inevitable cause of the failures, with the taxpayers making up the losses from operation.

**The Railroad Problem.** By Edward Hungerford. A. C. McClurg & Company, Chicago, Ill. 261 pages. Cloth, $1.50.

The book is a careful study of the physical and financial plight that has overtaken the railroads, and the cause thereof, written by a man who has been in the inside looking out and on the outside looking in. Greatly to the advantage of the book is the fact that Mr. Hungerford has applied to it in goodly measure much of the charm of presentation that has won for him such a host of readers for his magazine articles, some of which form the basis of chapters in the present volume. Mr. Hungerford does not attempt to make out a case for anybody, but he does run pretty well the gamut of the industry from the road itself through organized and unorganized labor. Perhaps the chapter of most interest to men in the electric railway industry is the one on "The Opportunity of the Railroad." For a beginning in this he takes the possibility of the application of electricity as motive power in the operation of the railroad. The opinion of the author is that electrification and general development of terminals have proceeded far too slowly. The book is dedicated to Samuel O. Dunn, editor of the *Railway Age Gazette.*

**Electric Traction: A Treatise on the Application of Electric Power to Tramways and Railways.** By A. T. Dover, lecturer on electric traction at the Battersea Polytechnic, London, England. New York, The Macmillan Company. 667 pages. 518 illustrations. Price $5.50.

In this book Mr. Dover has compiled a vast amount of information on the principles and present practice of electric railway engineering. As the name of the book indicates, it is quite technical in character, presumably having been the outgrowth of a comprehensive course of lectures. In fact, the general style and arrangement is about what one would expect in a course of advanced lectures on the subject. The author has had students as well as engineers in mind in writing this book, for he gives many examples such as one expects to find in text-books, and appends a number of examination questions drawn from several sources. He has produced a work which all who have to do with rolling stock and power distribution on electric railways can read with profit, even though much of the equipment described is of British manufacture. Obviously the fundamental principles which he takes up are of universal application.

The contents of the book can be roughly separated into two general parts, which, however, are appropriately interwoven. One consists of the theoretical discussion, with some mathematics, of the principles of car movement, motor operation, control, etc. The other is descriptive matter. Several varieties of alternating-current as well as direct current equipment are covered in both ways, that is theoretical and practical. One of the most valuable features in the whole treatment is the author's practice of commenting upon essential points, in the endeavor to bring out the logical reasons for the use of certain practices where such reasons exist.

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when it faced a crisis so he left the plow and saved the country.

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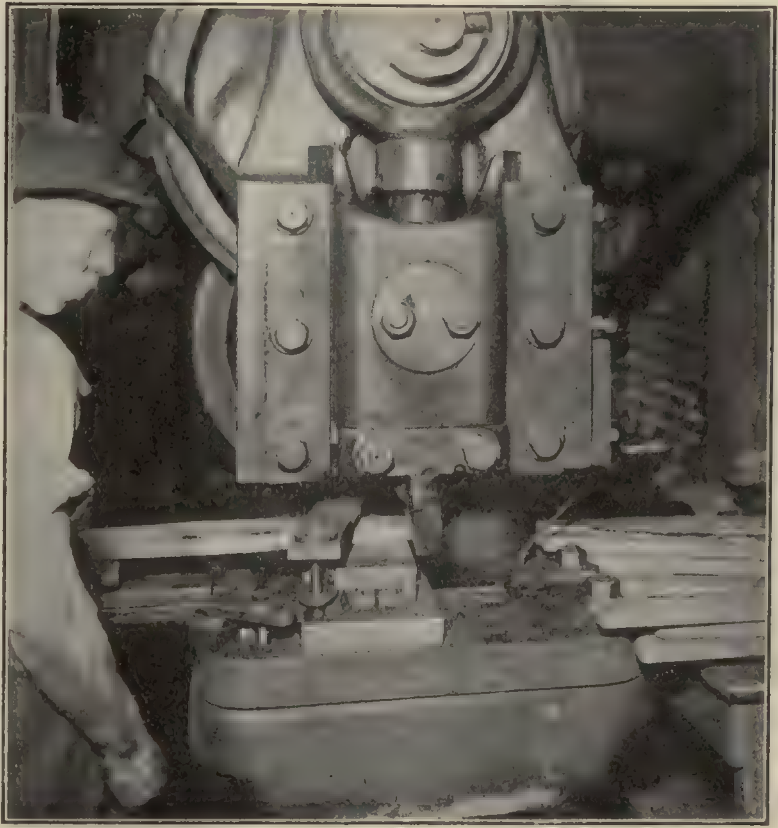
**Step No. 4 will show the rounding of the ends**



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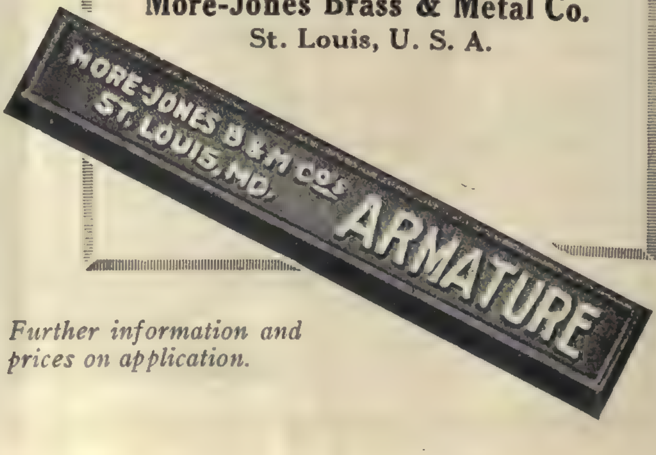

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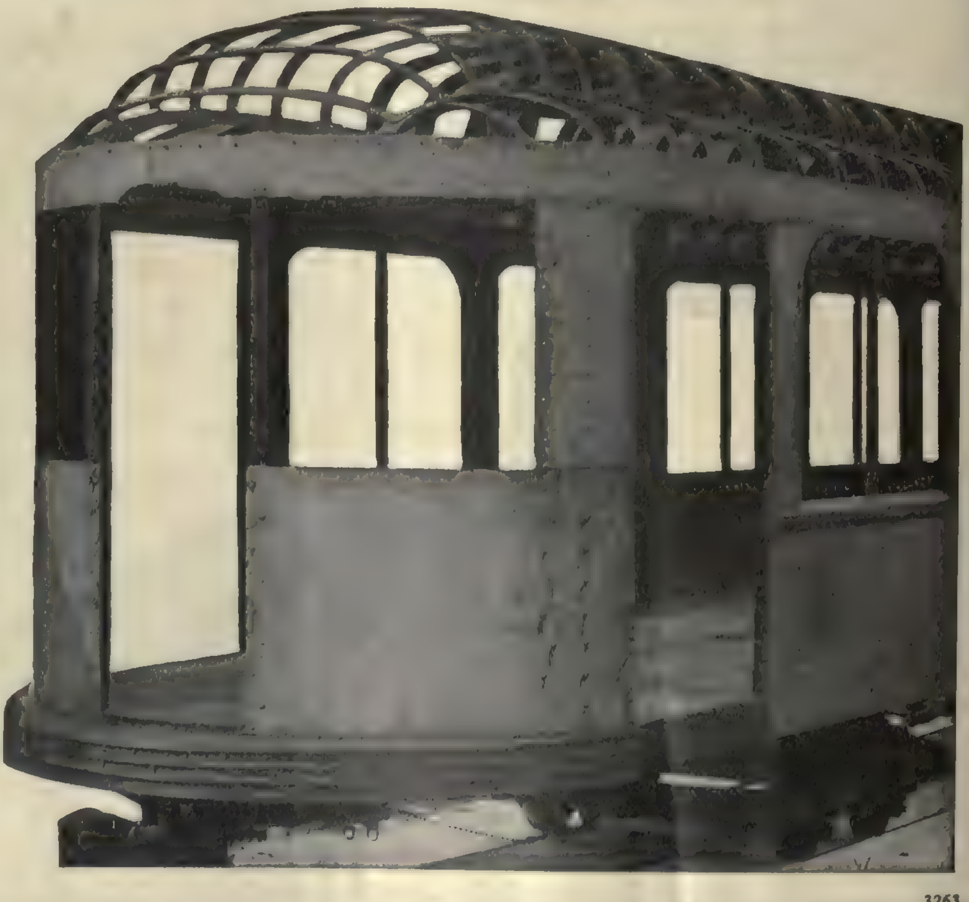

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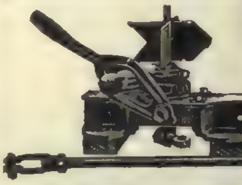

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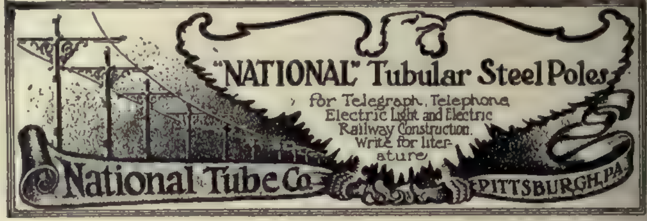

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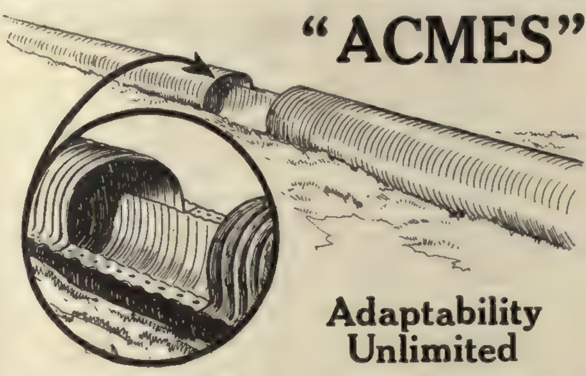

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## Have You Ever Analyzed the Heap of Junk in Your Yard?

Do you realize that a large percentage of the tubes, flues, and grates that compose it have had their uselessness hastened by bad feed water conditions?

Scale, Corrosion, Foaming, Pitting and Bagging quickly reduce boilers to junk. Overheating in an effort to offset the reduced steaming efficiency caused by scale, speedily burns out the tubes, and steam leaks produce bad effects on the grates, and also have a tendency to destroy the brick work of the furnace.

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which is a certain corrective for all feed water troubles, prolongs the life of not only the water containing parts of your boiler, but saves furnace parts as well.

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A standard material that should be in every electrical kit. Always needed and pays for itself a hundredfold in the repairs and lost time it saves.

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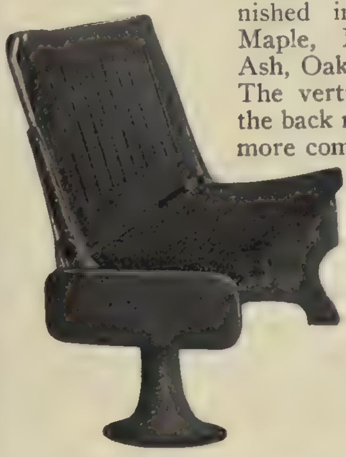

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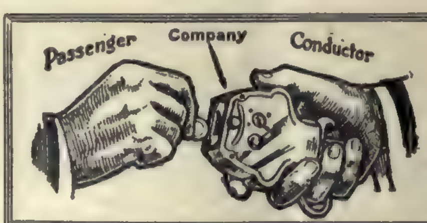

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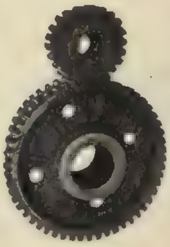

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Compact, Durable, Easily and Speedily Operated and Fireproof. Openings of any size may be equipped and the doors motor-operated if desired. Manufactured by the

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**HEATING AND VENTILATING YOUR CARS** is the problem to-day. Let us show you how to do both with one equipment. Now is the time to consider this change before you start your cars through the shops for overhauling. Kill two birds with one stone.

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If anti-friction bearings were not designed to assure easy installation and replacement by your shopmen, their power, lubrication and inspection savings would not be obtainable in practice.

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Why be bothered any more than necessary with gear troubles.

Gears cut from

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reduce such troubles to a minimum and thereby eliminate an endless amount of annoyance and useless expense.

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**MASON SAFETY TREADS**—prevent slipping and thus obviate damage suits.

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Above products are used on all leading railways. For details address

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You get more than simply BRAKE SHOES when you use our Product.

You get the advantage of our constant effort to improve our product for your service.

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Miles of service from the Brake Shoe are more to be desired than pounds of scrap.

All of which means increased efficiency and decreased cost of Brake Maintenance.

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If purchase of
Maximum
Traction Trucks
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learn all about the

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before closing.

It will benefit us both.

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Bemis Pins are absolutely smooth and true in diameter. We carry 40 different sizes of case hardened pins in stock. Samples furnished. Write for full data.

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for
STORAGE BATTERY STREET CARS
**THE ELECTRIC STORAGE BATTERY CO**
PHILADELPHIA

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4—W. H. 38-B **Motors**, complete with gears, pinions and gear casings.

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25—AA-1 Air **Compressors.**

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4 1000 KW. SETS:
Generators: 3 ph., 60 cy., 4500-2300 volts, 300 RPM.
Motors: 1050 Kva., 3 ph., 25 cy., 6600 volts, 300 RPM.
Exciters: Direct connected.
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Generator: Sgle. ph., 60 cycle, 2300 volts, 720 RPM.
Motor: 150 HP., 3 ph., 25 cy., 2300 volts, 720 RPM.
Exciter: 5 KW., direct connected.

## ROTARY CONVERTERS AND MOTOR GENERATOR SETS—25 Cycles

1 600 KW. Gen. Elec., TC-A, 3 ph., 600 volt, D.C., 375 volt A.C., 8 pole, 375 RPM.

1 600 KW. set consisting of two 300 KW. 6 pole generators, 550 volts, 600 amps., dir. conn. to one 750 HP. synchronous motor, 3 ph., 25 cy., 6600 volt, 500 RPM., complete with AC and DC panels.

4 500 KW. Gen. Elec., HC-K, 600 volt D.C., 4 pole, 750 RPM., each rotary complete with three 165 Kva. Gen. Elec. OI SC Transformers, HP-RP, 6600/5940 volts prim., 430/286/143 volts sec., also necessary panels and instruments.

1 500 KW. Westg., 3 ph., 550 volt D.C., 390 volt A.C., 6 pole, 500 RPM., with dir. conn. starting motor AC and DC panels and three 175 KW. Westg. oil cooled transformers, 13,200 volts prim., 390 volts sec.

## ROTARY CONVERTERS—60 Cycles

1 500 KW. Westinghouse, 6 ph., 6 pole, 600 volts D.C., 424 volts A.C., 1200 RPM., complete with switchboard and three 185 Kva. Westg. OI SC transformers, single ph., 2300 volts high tension.

1 300 KW. Westinghouse, 525-575 volts D.C., 600 RPM., with two 165 KW. Westg. oil insulated transformers, 2200 volts primary, 367 volts secondary.

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*Our new and complete list of steam and electrical equipment will be mailed upon request*

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1—500 KW. General Electric Curtis steam turbine, 3 ph., 60 cy., 1800 rpm., 2300 volts, 150 lb. steam pressure, vertical type.

1—500 K.W. Westinghouse Horizontal Turbo Generating Unit wound for 3 phase, 60 cycle, 2300 volts, speed 3600 rpm., condensing duty.

### 25 Cycle Rotary Converters

2—150 KW. General Electric type T.C., 4-150-750, 25 cycle, 3 ph., 575 volt, rotary converters, 750 rpm., complete with end play and speed limit device.

### 200 Kilowatt 60 Cycle Rotary Converters

1—200 KW. Westinghouse 3 ph., 60 cy. rotary converters, 550 volts, 720 rpm., complete with 4—100 KW. Westinghouse Scott connected oil insulated transformers, 10,000/9500 volts prim., 430/362 volts secy.

1—150 KW. Westinghouse 3 ph., 60 cy., rotary converter, 550 volts, 720 rpm.

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6—750 KVA. General Electric oil filled self cooled transformers, 4400/281 volts, with 4400-4290-4180-4070-2200-2090-1980 taps in the primary.

3—500 KW. General Electric, 60 cy., single phase transformers, 66,000 volts primary, 4400/2200 volts secondary.

3—375 KVA. Allis Chalmers O. I. S. C. indoor type transformers, 25 cy., 2300 v., 367 v. secy.

3—350 KVA. General Electric, type H, 60 cy., transformers 2400/2300/2200 v. prim., 200/400 v. secy.

1—100 KVA. General Electric, type H, 60 cy. transformer, 4600 volts prim., 115-230 volts secy.

4—100 KW. Westinghouse, oil insulated, Scott connected transformers, 10,000/9500 v. prim., 430/362 v. secy.

3—75 KW. Westinghouse 60 cy. transformers, 2200 v. prim., 110/220/440 v. secy.

3—50 KVA. General Electric type H, 60 cy. transformers, 900/1000/16000 v. prim. Y., 230/460 v. secy.

Also a stock of smaller sized transformers.

**IMMEDIATE DELIVERY**

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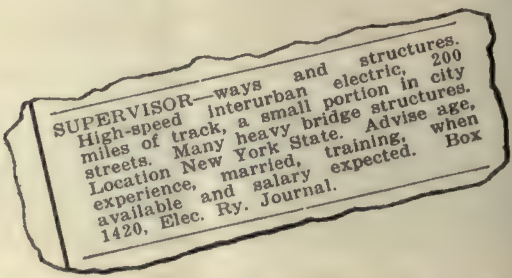
**TELEPHONE 4337-4338 RECTOR**

# We can help YOU, too



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4—404 H.P. B. & W. boilers, 16-foot tubes, 200 lbs. steam pressure, 125 superheat.
1—250 H.P. B. & W. boiler, 16-foot tubes, 175 lbs. steam pressure, 125 superheat.
1—250 H.P. Aultman & Taylor boiler, 16-foot tubes, 175 lbs. steam pressure.
4—Heine boilers, 187 H.P.
2—Heine boilers, 375 H.P.

**Chattanooga Railway & Light Co.,**
Chattanooga, Tennessee.

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FOR SALE

## CARS

**OPEN and CLOSED**
**MOTOR and TRAIL**

*Write for Price and Full Particulars to*

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Commonwealth Bldg. Philadelphia, Pa

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## RAILS

**SHANGHAI**
500 ton 6-in. 60 lb. Relay. Good.
**GIRDER RAIL**
38 ton 7 in. 114 lb. Grooved Girder. New.
**NEW WITH ANGLES**
200 ton 55 lb. A S CE.
1500 ton 60 lb. A S CE. Good as new.
230 ton 67 lb.
2000 ton 67½ lb.
335 ton 94 lb.
650 ton 100 lb.
If what you want is not listed here, write or wire us.

**Machinery Cars Equipment**

**ZELNICKER IN ST. LOUIS**
*Have you seen our new Bargain Bulletin?*

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FOR SALE

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20 Whs. 12-A
4 Whs. 38-B
20 Whs. 68
16 Whs. 76
8 Whs. 101-D

**Transit Equipment Co.**
**501 Fifth Ave., New York**

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IMMEDIATE SHIPMENT

1—300 K.W. Westinghouse, compound wound, 3 bearing, belt-driven

## Generator

speed 435 R.P.M., 550 volts.

**LEO A. PHILLIPS**
Steam & Electrical Equipment
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## 85 lb. A. S. C. E. Relayers

16,000 tons—with Angle Bars to match. Available immediate shipment and centrally located.
We positively own these Rails and offer same in carload lots and over.
25,000 tons—Relayers—sizes 25 lb. to 100 lb., in stock our Pittsburgh yards and vicinity.
Immediate shipment guaranteed and prices very attractive.
Carload and less than carload inquiries and orders solicited.
Rails cut to length for structural purposes.
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Complete Armatures, New Armatures, Rewound Armature Cores, Armature Shafts, Armature Coils, Fields and Commutators.

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FOR SALE

Four G. E. 214-C, four

## Motor Equipments

complete for single end operation with multiple unit control. These equipments are in excellent condition, having been run only about 55,000 miles. We have no use for them—account of changing from 600 DC. to 1200 DC.

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FOR SALE

## ONE CAR

Built by John Stephenson Co. Length over all 36′, length over post 26′, width 8′ 1″, trucks DuPont, wheel base 4′ 6″, 33″ wheels, 3″ tread, ¾ flange, 3¾ axles, motors, 4 G.E., 1000 K-12 controllers, to seat 36. Very low price.

**Wellsburg, Bethany & Washington Ry. Co.**
Wellsburg, W. Va.

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FOR SALE

## Overhead Steel Bridge

Skew 63° 8′. Designed for two 60-ton interurban cars. Main span of two through plate girders 53 feet long supported on four channel columns. Approaches of four 24″ 80-lb. I-beams, average length 29 ft. 6 in. Will sell entire bridge or any separate member.

**Indiana Railways & Light Company**
Kokomo, Indiana.

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### Wanted at Once

For immediate shipment any quantity of battery lead plates, sediment scrap copper and wire, brass and all other grades of scrap material. Write to us today for our prices. National Metal & Rubber Co., 31 India Wharf, Boston, Mass.

## POSITIONS WANTED

AS superintendent, train master or chief train dispatcher, with a good interurban company. 17 years' experience in operating department of electric and steam railways. Best reference. P. W. 1542 (Utah), Elec. Ry. Journal, San Francisco.

ENGINEER executive desires position as manager of public utility. Technical graduate, 15 years' experience engineering, operating and executive positions. Good record and references. P. W. 1555, (Ill.) Elec. Ry. Jour., Chicago.

EXECUTIVE position wanted with industrial or public utility company by graduate electrical engineer. Extensive railway, power and lighting experience and public utility valuations. Age 39. (N.Y.) PW1561, Elec. Ry. Journal, N. Y. C.

MAN, 45, with 25 years' accounting, traffic and operating experience, last 8 years' traffic and general manager small railroad, desires position with electric line. P. W., 1554 (Wis.), Elec. Ry. Journal, Chicago.

SHOP foreman, married, 35, long practical experience; inspector, overhauling, all equipments, system, economy, wants to change. PW 1557 (Ohio), Elec. Ry. Journal, Chicago.

## POSITIONS VACANT

ARMATURE winder and electrician familiar with general maintenance and capable of taking charge of rolling stock, small road, twelve cars. Give experience and salary. Married man preferred. P., 1531 (Mich.), Elec. Ry. Journal, Chicago.

DRAFTSMAN wanted for Master Mechanic's office. Must have good electrical and mechanical knowledge. State salary expected. Man over 31 years old preferred. P. 1544 (Pa.), Elec Ry. Journal, Philadelphia.

TRACK supervisor wanted for city and interurban road. Give details of past experience, together with age, salary expected and references in first letter. P., 1549 (Pa.), Elec. Ry. Journal, Phila.

## EMPLOYMENT AGENCIES

### Correspondence Service

The undersigned provides a confidential service designed to locate openings through correspondence for men earning not less than $2,500 and up to $25,000; all lines. Not an employment agency, but a constructive, initiative service, covering individual negotiations. Established 1910. Complete privacy assured; present connections in no way jeopardized. Send name and address only for explanatory details. R. W. Bixby, H1 Niagara Square, Buffalo, N. Y.

# WHAT AND WHERE TO BUY

## Equipment, Apparatus and Supplies Used by the Electric Railway Industry with Names of Manufacturers and Distributors

**Acetylene Service and Apparatus.**
Oxweld Acetylene Co.

**Advertising, Street Car.**
Collier, Inc., Barron G.

**Air Cleaners and Rectifiers.**
Horne Mfg. Co.

**Alloys, Steel and Iron. (See also Bearings and Bearing Metals.)**
Titanium Alloy Mfg. Co.

**Anchors, Guy.**
Electric Service Supplies Co.
Holden & White, Inc.
Ohio Brass Co.
Union Electric Co.
Western Electric Co.
Westinghouse Elec. & M. Co.

**Anti-Climbers.**
Railway Improvement Co.

**Automobiles and Buses.**
Brill Co., The J. G.

**Axle Straighteners.**
Columbia M. W. & M. I. Co.

**Axles, Car Wheel.**
Bemis Car Truck Co.
Brill Co., The J. G.
Carnegie Steel Co.
National Tube Co.
St. Louis Car Co.
Standard Steel Works Co.
Westinghouse Elec. & M. Co.

**Babbitting Devices.**
Columbia M. W. & M. I. Co.

**Badges and Buttons.**
Electric Service Supplies Co.
International Register Co., The
Western Electric Co.

**Bankers and Brokers.**
National City Co.

**Batteries, Dry.**
Western Electric Co.

**Batteries, Storage.**
Electric Storage Battery Co.
Western Electric Co.

**Bearings & Bearing Metals.**
Ajax Metal Co.
Bemis Car Truck Co.
Columbia M. W. & M. I. Co.
Eureka Co.
General Electric Co.
Kerschner Co., Inc., W. R.
Long Co., E. G.
More-Jones B. & M. Co.
St. Louis Car Co.
Westinghouse Elec. & M. Co.

**Bearings, Center and Roller Side.**
Baldwin Locomotive Works.
Holden & White, Inc.

**Bearings, Roller and Ball.**
Gurney Ball-Bearing Co.
Railway Roller Bearing Co.

**Bells and Gongs.**
Brill Co., The J. G.
Columbia M. W. & M. I. Co.
Electric Service Supplies Co.
St. Louis Car Co.
Western Electric Co.

**Benders, Rail.**
Niles-Bement-Pond Co.
Western Electric Co.
Zelnicker Sup. Co., W. A.

**Boilers.**
Babcock & Wilcox Co.

**Boiler Cleaning Compounds.**
Dearborn Chemical Co.

**Boiler Tubes.**
National Tube Co.

**Bond Testers.**
American Steel & Wire Co.

**Bonding Apparatus.**
American Steel & Wire Co.
Electric Railway Improvement Co.
Electric Service Supplies Co.
Ohio Brass Co.
Oxweld Acetylene Co.

**Bonds, Rail.**
American Steel & Wire Co.
Electric Railway Improvement Co.
Electric Service Supplies Co.
General Electric Co.
Lincoln Bonding Co.
Ohio Brass Co.
Union Electric Co.
Westinghouse Elec. & M. Co.

**Book Publishers.**
McGraw-Hill Book Co., Inc.

**Boring Tools, Car Wheel.**
Niles-Bement-Pond Co.

**Braces, Rail.**
Kilby Frog & Switch Co.

**Brackets and Cross Arms. (See also Poles, Ties, Posts, Etc.)**
Bates Expanded Steel Truss Co.
Electric Service Supplies Co.
Hubbard & Co.
Lindsley Bros. Co.
Ohio Brass Co.
Western Electric Co.

**Brake Adjusters.**
Holden & White, Inc.
Smith-Ward Brake Co.

**Brake Shoes.**
Amer. Brake Shoe & Fdry. Co.
Brill Co., The J. G.
Columbia M. W. & M. I. Co.
Long Co., E. G.
St. Louis Car Co.

**Brakes, Brake Systems and Brake Parts.**
Allis-Chalmers Mfg. Co.
Bemis Car Truck Co.
Brill Co., The J. G.
Columbia M. W. & M. I. Co.
General Electric Co.
Holden & White, Inc.
Horne Mfg. Co.
Long Co., E. G.
St. Louis Car Co.
Union Electric Co.
Westinghouse Trac. B. Co.

**Brooms, Track, Steel or Rattan.**
Western Electric Co.
Zelnicker Supply Co., W. A.

**Brush Holders.**
Anderson Mfg. Co., A. & J. M.
Columbia M. W. & M. I. Co.
Eureka Co.

**Brushes, Carbon.**
American Carbon & Battery Co.
General Electric Co.
Jeandron, W. J.
Morgan Crucible Co.
Western Electric Co.
Westinghouse Elec. & M. Co.

**Brushes, Graphite.**
Dixon Crucible Co., Jos.

**Bushings, Case Hardened and Manganese.**
Bemis Car Truck Co.

**Bushings, Fibre.**
Diamond State Fibre Co.

**Cables. (See Wires and Cables.)**

**Carbon Brushes. (See Brushes, Carbon.)**

**Car Equipment. (For Fenders, Heaters, Registers, Wheels, etc.—See those headings.)**

**Car Trimmings. (For Curtains, Registers, Doors, Seats, etc. — See those headings.)**

**Cars, Passenger, Freight, Express, etc.**
American Car Co.
Brill Co., The J. G.
Jewett Car Co.
Kuhlman Car Co., G. C.
St. Louis Car Co.
Stephenson Co., John
Wason Mfg. Co.

**Cars, Second Hand.**
Electric Equipment Co.
Kerschner Co., Inc., W. R.

**Cars, Self-Propelled.**
Electric Storage Battery Co.
General Electric Co.

**Castings, Brass, Composition or Copper.**
Anderson Mfg. Co., A. & J. M.
Columbia M. W. & M. I. Co.
Eureka Co.
Frankel Connector Co.
Horne Mfg. Co.
More-Jones B. & M. Co.

**Castings, Gray Iron and Steel.**
Amer. Brake Shoe & Fdry. Co.
Bemis Car Truck Co.
Columbia M. W. & M. I. Co.
Horne Mfg. Co.
Long Co., E. G.
St. Louis Car Co.
Standard Steel Works Co.
Union Spring & Mfg. Co.

**Castings, Malleable and Brass.**
Amer. Brake Shoe & Fdry. Co.
Bemis Car Truck Co.
Columbia M. W. & M. I. Co.
Horne Mfg. Co.
Long Co., E. G.
St. Louis Car Co.

**Catchers and Retrievers, Trolley.**
Electric Service Supplies Co.
Holden & White, Inc.
Horne Mfg. Co.
Kerschner Co., Inc., W. R.
Long Co., E. G.
Ohio Brass Co.
Union Electric Co.
Wood Co., Chas. N.

**Ceiling, Car.—(See Head Lining.)**

**Chemists.**
Little, Inc., Arthur D.

**Circuit Breakers.**
Cutter Electrical & Mfg. Co.
General Electric Co.
Western Electric Co.
Westinghouse Elec. & M. Co.

**Clamps and Connectors for Wires and Cables.**
Anderson Mfg. Co., A. & J. M.
Electric Service Supplies Co.
Frankel Connector Co.
General Electric Co.
Hubbard & Co.
Klein & Sons, Mathias.
Ohio Brass Co.
Union Electric Co.
Western Electric Co.
Westinghouse Elec. & M. Co.

**Cleaners and Scrapers, Track.—(See also Snow-Plows, Sweepers and Brooms.)**
Brill Co., The J. G.
Ohio Brass Co.
Van Dorn & Dutton Co.

**Clusters and Sockets.**
General Electric Co.

**Coal and Ash Handling.—(See Conveying and Hoisting Machinery.)**

**Coasting Recorders.**
Railway Improvement Co.

**Coil Banding and Winding Machines.**
Columbia M. W. & M. I. Co.
Electric Service Supplies Co.
Western Electric Co.

**Coils, Armature and Field.**
Cleveland Armature Works
Columbia M. W. & M. I. Co.
D & W Fuse Co.
General Electric Co.
Independent Lamp & Wire Co.
Westinghouse Elec. & M. Co.

**Coils, Choke and Kicking.**
Electric Service Supplies Co.
General Electric Co.
Westinghouse Elec. & M. Co.

**Coin-Counting Machines.**
International Register Co., The

**Commutator Slotters.**
Electric Service Supplies Co.
General Electric Co.
Westinghouse Elec. & M. Co.
Wood Co., Chas. N.

**Commutator Truing Devices.**
General Electric Co.

**Commutators or Parts.**
Cleveland Armature Works
Columbia M. W. & M. I. Co.
Eureka Co.
General Electric Co.
Long Co., E. G.
Western Electric Co.
Westinghouse Elec. & M. Co.

**Compressors, Air.**
Allis-Chalmers Mfg. Co.
General Electric Co.
Westinghouse Trac. B. Co.

**Condensers.**
Allis-Chalmers Mfg. Co.
General Electric Co.
Westinghouse Elec. & M. Co.

**Conduits.**
Western Electric Co.

**Connectors, Solderless.**
Frankel Connector Co.
Horne Mfg. Co.

**Controller Regulators.**
Electric Service Supplies Co.

**Controllers or Parts.**
Allis-Chalmers Mfg. Co.
Columbia M. W. & M. I. Co.
Electric Service Supplies Co.
General Electric Co.
Horne Mfg. Co.
Kerschner Co., Inc., W. R.
Westinghouse Elec. & M. Co.

**Controlling Systems.**
General Electric Co.
Westinghouse Elec. & M. Co.

**Converters, Rotary.**
Allis-Chalmers Mfg. Co.
General Electric Co.
Western Electric Co.
Westinghouse Elec. & M. Co.

**Conveying and Hoisting Machinery.**
Columbia M. W. & M. I. Co.
Green Engrg. Co.

**Cord, Bell, Trolley, Register, etc.**
Brill Co., The J. G.
Electric Service Supplies Co.
International Register Co., The
Long Co., E. G.
Roebling's Sons Co., John A.
Samson Cordage Works
Union Electric Co.

**Cord Connectors and Couplers.**
Electric Service Supplies Co.
Samson Cordage Works
Wood Co., Chas. N.

**Couplers, Car.**
Brill Co., The J. G.
Long Co., E. G.
Ohio Brass Co.
Van Dorn Coupler Co.
Westinghouse Trac. B. Co.

**Couplings, Conduit.**
Horne Mfg. Co.

**Cranes.—(See also Hoists.)**
Allis-Chalmers Mfg. Co.
Niles-Bement-Pond Co.
Van Dorn & Dutton Co.

Model 341
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One of the Portable Electrodynamometer Group, which also includes Model 310 Single Phase and D. C. Wattmeter, Model 329 Polyphase Wattmeter, and Model 370 A. C. and D. C. Ammeter.
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## WHAT AND WHERE TO BUY

**Creosoting. (See Wood Preservatives.)**

**Cross Arms. (See Brackets.)**

**Crossing Foundations.**
International Steel Tie Co.

**Crossing Signals. (See Signals, Crossing.)**

**Crossings, Track. (See Track, Special Work.)**

**Crushers, Rock.**
Allis-Chalmers Mfg. Co.

**Culverts.**
Canton Culvert & Silo Co.

**Curtains and Curtain Fixtures.**
Brill Co., The J. G.
Electric Service Supplies Co.
Hartshorn Company, Stewart
Pantasote Co., The
St. Louis Car Co.

**Cutting Apparatus.**
Oxweld Acetylene Co.

**Derailing Devices. (See also Track Work.)**
Cleveland Frog & Crossing Co.

**Destination Signs.**
Columbia M. W. & M. I. Co.
Electric Service Supplies Co.
Western Electric Co.

**Detective Service.**
Wisch Service, P. Edward

**Dispatching Systems.**
Simmen Automatic Ry. Sig. Co.
Western Electric Co.

**Door Operating Devices.**
Consolidated Car Heating Co.

**Doors and Door Fixtures.**
Brill Co., The J. G.
General Electric Co.
Hale & Kilburn Co.

**Doors & Shutters, Fireproof.**
Kinnear Mfg. Co.

**Doors, Steel Rolling.**
Kinnear Mfg. Co.

**Draft Rigging. (See Couplers.)**

**Drills, Track.**
American Steel & Wire Co.
Electric Service Supplies Co.
Long Co., E. G.
Niles-Bement-Pond Co.
Ohio Brass Co.
Union Electric Co.

**Dryers, Sand.**
Electric Service Supplies Co.
Union Electric Co.
Zelnicker Sup. Co., W. A.

**Engineers, Consulting, Contracting and Operating**
Archbold-Brady Co.
Arnold Co., The
Beeler, John A.
Byllesby & Co., Inc., H. M.
Drum & Co., A. L.
Ford, Bacon & Davis
Hunt & Co., Robert W.
Jackson, D. C. & Wm. B.
Little, Inc., Arthur D.
Richey, Albert S.
Sanderson & Porter
Scofield Engineering Co.
Stone & Webster Eng. Corp.
White Companies, J. G.
Woodmansee & Davidson, Inc.

**Engines, Gas and Oil.**
Allis-Chalmers Mfg. Co.
Westinghouse Elec. & M. Co.

**Engines, Steam.**
Allis-Chalmers Mfg. Co.
Westinghouse Elec. & M. Co.

**Fare Boxes.**
Brill Co., The J. G.
Cleveland Fare Box Co.
International Register Co., The

**Fences, Woven Wire and Fence Posts.**
American Steel & Wire Co.
Page Woven Wire Fence Co.

**Fenders and Wheel Guards.**
Brill Co., The J. G.
Cleveland Fare Box Co.
Consolidated Car Fender Co.
Electric Service Supplies Co.
Horne Mfg. Co.
Star Brass Works
Western Electric Co.

**Fibre Insulation.**
National Ry. Appliance Co.

**Fibre and Fibre Tubing.**
Diamond State Fibre Co.
Westinghouse Elec. & M. Co.

**Field Coils. (See Coils.)**

**Floodlights.**
Crouse-Hinds Co.

**Flooring Composition.**
American Mason Safety Tread Co
Western Electric Co.

**Forgings.**
Eureka Co.
Standard Steel Works Co.

**Frogs, Track. (See Track Work.)**

**Furnaces. (See Stokers.)**

**Fuses and Fuse Boxes.**
Columbia M. W. & M. I. Co.
D & W Fuse Co.
Daum, A. F.
General Electric Co.
Western Electric Co.
Westinghouse Elec. & M. Co.

**Fuses, Refillable.**
Columbia M. W. & M. I. Co.
General Electric Co.
Horne Mfg. Co.

**Gaskets.**
Diamond State Fibre Co.
Power Specialty Co.

**Gas Producers.**
Westinghouse Elec. & M. Co.

**Gates, Car.**
Brill Co., The J. G.
Jewett Car Co.

**Gages, Oil and Water.**
Ohio Brass Co.

**Gear Blanks.**
Carnegie Steel Co.
Diamond State Fibre Co.
Standard Steel Works Co.

**Gear Cases.**
Columbia M. W. & M. I. Co.
Electric Service Supplies Co.
Kerschner Co., Inc., W. R.
National Ry. Appliance Co.
Westinghouse Elec. & M. Co.
Union Electric Co.

**Gears and Pinions.**
Columbia M. W. & M. I. Co.
Diamond State Fibre Co.
Electric Service Supplies Co.
General Electric Co.
Kerschner Co., Inc., W. R.
Long Co., E. G.
National Ry. Appliance Co.
Nuttall Co., R. D.
Union Electric Co.
Van Dorn & Dutton Co.

**Generating Sets, Gas-Electric.**
General Electric Co.

**Generators.**
Allis-Chalmers Mfg. Co.
General Electric Co.
Western Electric Co.
Westinghouse Elec. & M. Co.

**Gongs. (See Bells and Gongs.)**

**Graphite.**
Dixon Crucible Co., Joseph
Morgan Crucible Co.

**Greases. (See Lubricants.)**

**Grinders and Grinding Supplies.**
General Electric Co.
Goldschmidt Thermit Co.
Railway Track-work Co.
Western Electric Co.

**Guards, Trolley.**
Electric Service Supplies Co.
Ohio Brass Co.

**Harps, Trolley.**
Anderson M. Co., A. & J. M.
Electric Service Supplies Co.
More-Jones B. & M. Co.
Nuttall Co., R. D.
Star Brass Works.
Western Electric Co.

**Headlights.**
Crouse-Hinds Co.
Electric Service Supplies Co.
General Electric Co.
Kerschner Co., Inc., W. R.
Long Co., E. G.
Ohio Brass Co.
St. Louis Car Co.
Union Electric Co.
Westinghouse Elec. & M. Co.

**Headlining.**
Kerschner Co., Inc., W. R.
Pantasote Co., The.

**Heaters, Car (Electric).**
Consolidated Car Heating Co.
Gold Car Heating & Lighting Co.
Smith Heater Co., Peter.

**Heaters, Car, Hot Air and Water.**
Cooper Heater Co.
Smith Heater Co., Peter.

**Heaters, Car (Stove).**
Electric Service Supplies Co.
Smith Heater Co., Peter.

**Hoists and Lifts.**
Columbia M. W. & M. I. Co.
Duff Mfg. Co.
Ford Chain Block & Mfg. Co.
Niles-Bement-Pond Co.
Van Dorn & Dutton Co.

**Hose, Bridges.**
Ohio Brass Co.

**Hydraulic Machinery.**
Allis-Chalmers Mfg. Co.
Niles-Bement-Pond Co.

**Hydrogrounds.**
Horne Mfg. Co.

**Inspection.**
Electrical Testing Lab's.
Hunt & Co., Robt. W.

**Instruments, Measuring, Testing and Recording.**
General Electric Co.
Sangamo Electric Co.
Western Electric Co.
Westinghouse Elec. & M. Co.
Weston Elec'l Instrument Co.

**Insulating Cloth, Paper and Tape.**
Diamond State Fibre Co.
General Electric Co.
Packard Electric Co.
Sherwin-Williams Co.
Standard Woven Fabric Co.
Western Electric Co.
Westinghouse Elec. & M. Co.

**Insulations. (See also Paints.)**
Anderson M. Co., A. & J. M.
Diamond State Fibre Co.
Electric Service Supplies Co.
General Electric Co.
Holden & White, Inc.
Sherwin-Williams Co.
Union Electric Co.
Western Electric Co.
Westinghouse Elec. & M. Co.

**Insulators. (See also Line Material.)**
Anderson M. Co., A. & J. M.
Electric Service Supplies Co.
General Electric Co.
Ohio Brass Co.
Union Electric Co.
Western Electric Co.
Westinghouse Elec. & M. Co.

**Insulator Pins.**
Hubbard & Co.

**Jacks. (See also Cranes, Hoists and Lifts.)**
Brill Co., The J. G.
Buckeye Jack Mfg. Co.
Columbia M. W. & M. I. Co.
Duff Manufacturing Co.
National Ry. Appliance Co.

**Joints, Rail.**
Atlantic Welding Co.
Carnegie Steel Co.
Lackawanna Steel Co.
Zelnicker Sup. Co., W. A.

**Journal Boxes.**
Bemis Car Truck Co.
Brill Co., The J. G.
Long Co., E. G.
Railway Roller Bearing Co.

**Laboratory.**
Electric Testing Lab's.
Little, Inc., Arthur D.

**Lamp Guards and Fixtures.**
Anderson M. Co., A. & J. M.
Electric Service Supplies Co.
General Electric Co.
Westinghouse Elec. & M. Co.

**Lamps, Arc and Incandescent. (See also Headlights.)**
Anderson M. Co., A. & J. M.
General Electric Co.
Western Electric Co.
Westinghouse Elec. & M. Co.

**Lamps, Signal and Marker.**
Ohio Brass Co.

**Lathes, Car Wheel.**
Niles-Bement-Pond Co.

**Lighting Regulators, Car.**
Holden & White, Inc.

**Lightning Protection.**
Anderson M. Co., A. & J. M.
Electric Service Supplies Co.
General Electric Co.
Horne Mfg. Co.
Ohio Brass Co.
Union Electric Co.
Western Elec. Co.
Westinghouse Elec. & M. Co.

**Line Material. (See also Brackets, Insulators, Wires, etc.)**
Anderson M. Co., A. & J. M.
Columbia M. W. & M. I. Co.
Diamond State Fibre Co.
Electric Service Supplies Co.
Eureka Co.
General Electric Co.
Holden & White, Inc.
Hubbard & Co.
More-Jones B. & M. Co.
Ohio Brass Co.
Union Electric Co.
Western Electric Co.
Westinghouse Elec. & M. Co.

**Locomotives, Electric.**
Baldwin Locomotive Works.
Brill Co., The J. G.
General Electric Co.
Westinghouse Elec. & M. Co.

**Lubricating Engineers.**
Galena-Signal Oil Co.

**Lubricants, Oil and Grease.**
Dearborn Chemical Co.
Dixon Crucible Co., Jos.
Galena-Signal Oil Co.

**Lumber. (See Poles, Ties, etc.)**

**Machine Tools.**
Columbia M. W. & M. I. Co.
Niles-Bement-Pond Co.

**Machine Work.**
Columbia M. W. & M. I. Co.
Horne Mfg. Co.

**Meters. (See Instruments.)**

**Meters, Car, Watt-Hour.**
Sangamo Electric Co.

**Mica.**
Long Co., E. G.

**Motormen's Seats.**
Electric Service Supplies Co.
Wood Co., Chas. N.

**Motors, Electric.**
Allis-Chalmers Mfg. Co.
General Electric Co.
Western Electric Co.
Westinghouse Elec. & M. Co.

**Motor Generation, Bonding and Welding.**
Lincoln Bonding Co.

**Nuts and Bolts.**
Allis-Chalmers Mfg. Co.
Bemis Car Truck Co.
Columbia M. W. & M. I. Co.
Hubbard & Co.
Lackawanna Steel Co.
Long Co., E. G.
National Railway Appliance Co.

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# WHAT AND WHERE TO BUY

**Oils. (See Lubricants.)**

**Oxy-Acetylene. (See Cutting Apparatus, Oxy-Acetylene.)**

**Packing.**
Diamond State Fibre Co.
Electric Service Supplies Co.
Horne Mfg. Co.
Power Specialty Co.

**Paints and Varnishes. (Insulating.)**
General Electric Co.
Long Co., E. G.
Packard Electric Co.
Sherwin-Williams Co.
Union Electric Co.

**Paints and Varnishes. (Preservative.)**
Dixon Crucible Co., Jos.
Long Co., E. G.
National Ry. Appliance Co.
Sherwin-Williams Co.

**Paints and Varnishes for Woodwork.**
National Ry. Appliance Co.
Sherwin-Williams Co.

**Paving Bricks, Filler and Stretcher.**
Nelsonville Brick Co.

**Paving Material.**
Am. Brake Shoe & Fdy. Co.
Nelsonville Brick Co.

**Pickups, Trolley Wire.**
Electric Service Supplies Co.
Ohio Brass Co.

**Pinion Pullers.**
Columbia M. W. & M. I. Co.
Electric Service Supplies Co.
General Electric Co.
Wood Co., Chas. N.

**Pinions. (See Gears.)**

**Pins, Case Hardened, Wood and Iron.**
Bemis Car Truck Co.
Electric Service Supplies Co.
Long Co., E. G.
Ohio Brass Co.
Union Electric Co.

**Pipe.**
National Tube Co.

**Pipe Fittings.**
National Tube Co.
Power Specialty Co.
Standard Steel Works Co.

**Planers. (See Machine Tools.)**

**Pole Reinforcing.**
Hubbard & Co.

**Poles and Ties, Treated.**
Lindsley Bros. Co.
Western Electric Co.

**Poles, Metal Street.**
Bates Expanded Steel Truss Co.
Hubbard & Co.
National Tube Co.

**Poles, Ties, Posts, Piling and Lumber.**
Carney & Co., B. J.
Lindsley Bros. Co.
Western Electric Co.

**Poles, Trolley.**
Anderson M. Co., A. & J. M.
Columbia M. W. & M. I. Co.
Electric Service Supplies Co.
Long Co., E. G.
National Tube Co.
Nuttall Co., R. D.
Union Electric Co.

**Power Saving Devices.**
Arthur Power-Saving Recorder Co.
Railway Improvement Co.

**Pressure Regulators.**
General Electric Co.
Ohio Brass Co.

**Pumps.**
Allis-Chalmers Mfg. Co.

**Punches, Ticket.**
Bonney-Vehslage Tool Co.
International Register Co., The.
Wood Co., Chas. N.

**Rail Grinders. (See Grinders.)**

**Rail Welding. (See Brazing and Welding Processes.)**

**Rails, Relaying.**
Zelnicker Supply Co., W. A.

**Rattan.**
Brill Co., The J. G.
Electric Service Supplies Co.
Hale & Kilburn Co.
Jewett Car Co.
St. Louis Car Co.

**Recorders, Power Saving.**
Arthur Power-Saving Recorder Co.

**Registers and Fittings.**
Bonham Recorder Co.
Brill Co., The J. G.
Electric Service Supplies Co.
International Register Co., The.
Long Co., E. G.
Rooke Automatic Register Co.
Union Electric Co.

**Reinforcement, Concrete.**
American Steel & Wire Co.

**Repair Shop Appliances. (See also Coil Banding and Winding Machines.)**
Columbia M. W. & M. I. Co.
Electric Service Supplies Co.

**Repair Work. (See also Coils.)**
Cleveland Armature Works.
Columbia M. W. & M. I. Co.
General Electric Co.
Independent Lamp & Wire Co.
Westinghouse Elec. & M. Co.

**Replacers, Car.**
Columbia M. W. & M. I. Co.
Electric Service Supplies Co.

**Resistance, Grid.**
Columbia M. W. & M. I. Co.

**Resistance, Wire and Tube.**
General Electric Co.
Western Electric Co.
Westinghouse Elec. & M. Co.

**Retrievers, Trolley. (See Catchers and Retrievers, Trolley.)**

**Rheostats.**
General Electric Co.
Westinghouse Elec. & M. Co.

**Roofing, Car.**
Pantasote Co., The.

**Sand Blasts.**
National Ry. Appliance Co.

**Sanders, Track.**
Brill Co., The J. G.
Cleveland Fare Box Co.
Columbia M. W. & M. I. Co.
Electric Service Supplies Co.
Horne Mfg. Co.
Holden & White, Inc.
Jewett Car Co.
Ohio Brass Co.
St. Louis Car Co.

**Sash Fixtures, Car.**
Brill Co., The J. G.

**Sash Metal, Car Window.**
Hale & Kilburn Co.

**Sash Operators.**
Drouvé Co., The G.

**Scales, Weights, Balances and Dynamometers.**
Horne Mfg. Co.

**Scrapers, Track. (See Cleaners and Scrapers, Track.)**

**Seating Material. (See also Rattan.)**
Pantasote Co., The.

**Seats, Car.**
Brill Co., The J. G.
Hale & Kilburn Co.
Jewett Car Co.
St. Louis Car Co.

**Second-Hand Equipment. (See also pages 44, 45.)**
Archer & Baldwin.
Kerschner Co., Inc., W. R.
MacGovern & Co., Inc.

**Shade Rollers.**
Hartshorn Co., Stewart.

**Shades, Vestibule.**
Brill Co., The J. G.
Electric Service Supplies Co.

**Shovels.**
Hubbard & Co.

**Shovels, Power.**
Allis-Chalmers Mfg. Co.

**Signal Systems, Block.**
Electric Service Supplies Co.
Federal Signal Co.
Nachod Signal Co., Inc.
Simmen Automatic Railway Signal Co.
Western Electric Co.
Wood Co., Chas. N.

**Signals, Car Starting.**
Consolidated Car Heating Co.

**Signals, Highway Crossing.**
Electric Service Supplies Co.
Nachod Signal Co., Inc.

**Skylights, Steel Puttyless.**
Drouvé Co., The G.

**Slack Adjusters.**
**(See Brake Adjusters.)**

**Sleet Wheels and Cutters.**
Anderson Mfg. Co., A. & J. M.
Bonney-Vehslage Tool Co.
Columbia M. W. & M. I. Co.
Holden & White, Inc.
More-Jones B. & M. Co.
Nuttall Co., R. D.

**Snow-Plows, Sweepers and Brooms.**
Brill Co., The J. G.
Columbia M. W. & M. I. Co.
Consolidated Car Fender Co.

**Soaps.**
Sherwin-Williams Co.

**Soldering and Brazing Apparatus. (See Welding, Processes and Apparatus.)**

**Spikes.**
American Steel & Wire Co.
Lackawanna Steel Co.

**Splicing Compounds.**
Standard Woven Fabric Co.
Westinghouse Elec. & M. Co.

**Splicing Sleeves. (See Clamps and Connectors.)**

**Springs, Car & Truck.**
American Steel & Wire Co.
Bemis Car Truck Co.
Brill Co., The J. G.
Long Co., E. G.
Standard Steel Works Co.
Union Spring & Mfg. Co.

**Sprinklers, Track & Road.**
Brill Co., The J. G.
St. Louis Car Co.

**Steps, Car.**
American Mason S. T. Co.
Universal Safety Tread Co.

**Stokers, Mechanical.**
Babcock & Wilcox Co.
Green Engrg. Co.
Murphy Iron Works.
Westinghouse Elec. & M. Co.

**Storage Batteries. (See Batteries, Storage.)**

**Straps, Car, Sanitary.**
Holden & White, Inc.
Railway Improvement Co.

**Structural Iron.**
**(See Bridges.)**

**Sub Stations.**
Delta Star Electric Co.

**Superheaters.**
Babcock & Wilcox Co.
Power Specialty Co.

**Sweepers, Snow. (See Snow Plows, Sweepers & Brooms.)**

**Switch Stands.**
Kilby Frog & Switch Co.
Ramapo Iron Works.

**Switches, Automatic.**
Western Electric Co.

**Switches, Track. (See Track, Special Work.)**

**Switchboard Mats.**
Western Electric Co.

**Switches & Switchboards.**
Allis-Chalmers Mfg. Co.
Anderson Mfg. Co., A. & J. M.
Cutter Electrical & Mfg. Co.
Delta Star Electric Co.
Electric Service Supplies Co.
General Electric Co.
Western Electric Co.
Westinghouse Elec. & M. Co.

**Tampers, Tie.**
Ingersoll-Rand Co.

**Tapes and Cloths. (See Insulating Cloths, Paper and Tape.)**

**Telephones and Parts.**
Electric Service Supplies Co.
Western Electric Co.

**Testing Clips.**
Frankel Connector Co.

**Testing, Commercial & Electrical.**
Elec'l Testing Laboratories.
Hunt & Co., Robert W.

**Testing Instruments. (See Instruments, Electrical Measuring, Testing, etc.)**

**Thermostats.**
Consolidated Car Heating Co.
Gold Car Heating & Lighting Co.
Railway Utility Co.
Smith Heater Co., Peter.

**Ticket Choppers & Destroyers.**
Electric Service Supplies Co.

**Ties and Tie Rods, Steel.**
Carnegie Steel Co.
International Steel Tie Co.

**Ties, Wood Cross. (See Poles, Ties, Posts, etc.)**

**Tools, Track & Miscellaneous.**
American Steel & Wire Co.
Columbia M. W. & M. I. Co.
Electric Service Supplies Co.
Hubbard & Co.
Klein & Sons, Mathias.
Railway Track-work Co.
Union Electric Co.

**Torches, Acetylene. (See Cutting Apparatus.)**

**Towers & Transmission Structures.**
Archbold-Brady Co.
Bates Exp. Steel Truss Co.
Delta Star Electric Co.
Westinghouse Elec. & M. Co.

**Tower Wagons and Automobiles.**
McCardell & Co., J. R.

**Track, Special Work.**
Cleveland Frog & Cross. Co.
Columbia M. W. & M. I. Co.
Kilby Frog & Switch Co.
New York Switch & Crossing Co.
Ramapo Iron Works.

**Transfers. (See Tickets.)**

**Transfer Tables.**
Archbold-Brady Co.

**Transformers.**
Allis-Chalmers Mfg. Co.
General Electric Co.
Packard Electric Co.
Western Electric Co.
Westinghouse Elec. & M. Co.

**Treads, Safety, Stairs, Car Step.**
American Mason S. T. Co.
Universal Safety Tread Co.

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## Koravas

Before the thieving Koravas set out on a predatory expedition they decorate a goat and bring it before a favorite idol.

The idol is then asked whether the expedition will be a success.

If the goat acts good it is taken as an affirmative answer—if he acts badly they abandon the trip.

In much the same way the maker of a freak variety of carbon brushes selects a goat to try out his product.

Of course, as a matter of good business he selects a goat that won't act up bad, and so he sets out on his deadly errand.

If every carbon brush user knew that his best commutation can come only from Morganite brushes prescribed for the service there would be no field for such brush depredations —but *everyone* doesn't know this,

—and this is printed as a warning to the unwary.

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Charles Farnham, I. W. Hellman Bldg., Los Angeles, Cal.

# WHAT AND WHERE TO BUY

**Trolley Bases.**
Anderson Mfg. Co., A. & J. M.
Electric Service Supplies Co.
General Electric Co.
Holden & White, Inc.
Horne Mfg. Co.
More-Jones B. & M. Co.
Nuttall Co., R. D.
Ohio Brass Co.
Union Electric Co.

**Trolley Bases, Retrieving.**
Holden & White, Inc.

**Trolleys & Trolley Systems.**
Ford Chain Block & Mfg. Co.

**Trolley Shoes.**
Holden & White, Inc.
Miller Trolley Shoe Co.

**Trolley Wheels. (See Wheels, Trolley.)**

**Trucks, Car.**
Baldwin Locomotive Works.
Bemis Car Truck Co.
Brill Co., The J. G.
Long Co., E. G.
St. Louis Car Co.

**Tubing, Steel.**
National Tube Co.

**Turbines, Steam.**
Allis-Chalmers Mfg. Co.
General Electric Co.
Western Electric Co.
Westinghouse Elec. & M. Co.

**Turbines, Water.**
Allis-Chalmers Mfg. Co.

**Turnstiles.**
Perey Mfg. Co., Inc.

**Union Couplings.**
National Tube Co.

**Vacuum Impregnation.**
Allis-Chalmers Mfg. Co.

**Valves.**
National Tube Co.
Ohio Brass Co.

**Varnishes. (See Paints, etc.)**

**Ventilators, Building.**
Drouvé Co., The G.

**Ventilators, Car.**
Brill Co., The J. G.
Globe Ventilator Co.
Holden & White, Inc.
Railway Utility Co.
St. Louis Car Co.

**Voltmeters. (See Instruments.)**

**Washers.**
Diamond State Fibre Co.

**Welders, Portable Electric.**
Electric Railway Improvement Co.

**Welding Processes and Apparatus.**
Atlantic Welding Co.
Electric Railway Improvement Co.
General Electric Co.
Goldschmidt Thermit Co.
National Ry. Appliance Co.
Oxweld Acetylene Co.
Westinghouse Elec. & M. Co.

**Wheel Guards. (See Fenders & Wheel Guards.)**

**Wheel Presses. (See Machine Tools.)**

**Wheels, Car, Cast Iron.**
Bemis Car Truck Co.
Long Co., E. G.

**Wheels, Car, Steel and Steel Tired.**
Bemis Car Truck Co.
Carnegie Steel Co.
Standard Steel Works Co

**Wheels, Trolley.**
Anderson Mfg. Co., A. & J. M.
Columbia M. W. & M. I. Co.
Electric Service Supplies Co.
Eureka Co.
General Electric Co.
Holden & White, Inc.
Long Co., E. G.
More-Jones B. & M. Co.
Nuttall Co., R. D.
Star Brass Works.
Union Electric Co.

**Whistles, Air.**
General Electric Co.
Ohio Brass Co.

**Window Operators.**
Drouvé Co., The G.

**Wire Rope.**
American Steel & Wire Co.
Roebling's Sons Co., John A.

**Wires and Cables.**
Aluminum Co. of America.
American Steel & Wire Co.
Bridgeport Brass Co.
D & W Fuse Co.
General Electric Co.
Packard Electric Co.
Page Woven Wire Fence Co.
Roebling's Sons Co., John A.
Western Electric Co.
Westinghouse Elec. & M. Co.

**Wood Preservatives.**
Lindsley Bros. Co.
Sherwin-Williams Co.

**Woodworking Machinery.**
Allis-Chalmers Mfg. Co.

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# TITANIUM-TREATED RAIL

## Saves Money on Curves—
## Why Not on Tangents Also?

A logical question—and the Brooklyn Rapid Transit Co. answered it by specifying Titanium-treated for all its tangent track bought for 1914 and 1915.

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### "Rail Reports"

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# GURNEY

## Cut Your Coal Bills

The high price of coal is something that most power users have to consider this year.

One way to save coal is to use ball bearing equipment that eliminates most of the waste and loss of bearing friction. In addition to the power saving, the fact that ball bearings will often run for six months to a year without adding lubricant, makes their maintenance cost very low, and the fact that "hot boxes" are practically unknown on ball bearing equipment, gives such equipment much more reliable operation than equipment in which "hot boxes" are common.

Gurney Ball Bearings have greater load capacities than other ball bearings of equal size. They have repeatedly made good where other ball bearings have failed. Ask our Engineers to help solve your bearing problems.

**Gurney Ball Bearing Co.**
**Conrad Patent Licensee**
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**Chicago, Ill.** **New York City**
162

# Frame Squareness and Strength

Bolting up the frame temporarily, then taking out one bolt at a time, reaming the holes thru the forged fold-over gusset plates, forged side frames and forged transom corner-brackets and driving in "body-bound" bolts, is the Brill method of securing the side frames to the transoms, and, excepting the gussets and brackets, is the same for the end frames. The method is peculiar to Brill truck construction —it belongs to the solid forged side frame.

THE J. G. BRILL COMPANY, PHILADELPHIA, PA.
AMERICAN CAR COMPANY, ST. LOUIS, MO.
G. C. KUHLMAN CAR CO., CLEVELAND, OHIO.
JOHN STEPHENSON CO., ELIZABETH, N. J.
WASON MANFG. CO., SPRINGFIELD, MASS.
CIE J. G. BRILL, 49 Rue des Mathurins, PARIS.

# G-E Motor Generator Sets

The success of the commutating pole generator on G-E motor generators used in heavy railway service is well known.

For extremely heavy service the G-E Generators are now equipped with compensating pole-face windings.

The Butte, Anaconda & Pacific, the Chicago, Milwaukee & St. Paul and the Eastern Michigan Power Company motor generators are notable examples of this type.

Other G-E motor generator sets recently built for railway service are as follows:

## Recent Sales of Railway Motor-Generator Sets

| | | |
|---|---|---|
| Arkansas Valley Int. Railway | | 1- 300 KW |
| Benton Harbor & St. Joe Railway | | 1- 500 KW |
| Butte, Anaconda & Pacific Railway | (Total of 7) | 2- 1000 KW |
| Columbus Ry. Pr. & Lt. Company | | 1- 750 KW |
| Detroit Edison Company | | 6- 1000 KW |
| Detroit United Railway | | 2- 1500 KW |
| El Paso Electric Company | | 1- 300 KW |
| Great Western Pr. Company | | 3- 2000 KW |
| Holyoke St. Ry. Company | | 1- 500 KW |
| Lincoln Traction Company | | 1- 500 KW |
| Nashville Rwy. & Lt. Company | | 1- 2000 KW |
| Pittsburgh, Harmony, Butler & New Castle Ry. | | 2- 500 KW |
| Public Service Elect. Company | | 1- 1000 KW |
| Public Utilities Company | | 1- 1000 KW |
| Rockland, Thomaston & Camden St. Ry. | | 1- 400 KW |
| Spokane & Inland Empire Railway | | 1- 2000 KW |
| Wisconsin, Minnesota Power Company | | 1- 500 KW |

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New York, July 21, 1917 McGraw-Hill Publishing Co., Inc. Vol. 50, No. 3 10c a copy

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The best insurance against rail wear

4 Years of TITANIUM

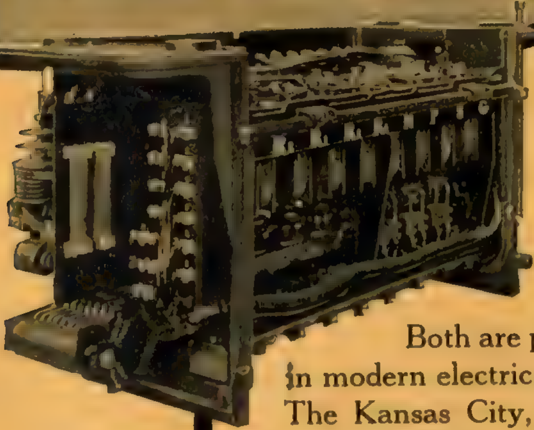
on the Oakland, Antioch & Eastern Railway have proved the superb wearing qualities of Titanium-Treated rails on this road of fast service and unavoidable sharp curves.

*Titanium Pays in Any Service*

**Titanium Alloy Manufacturing Company**

Niagara Falls, N. Y.

TPC
Reg. U. S. Pat. Off.
TRADE MARK



# HL Control 306-CV Motors Westinghouse Throughout

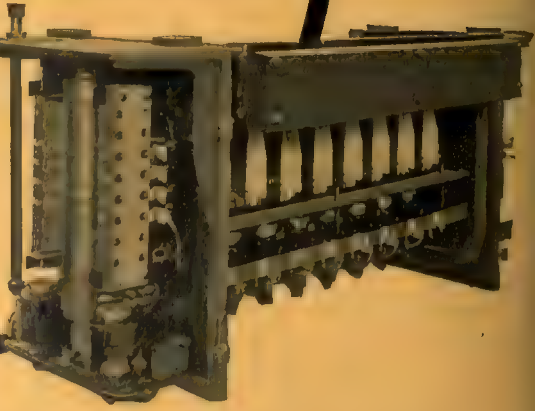
Both are pioneers and still the "pace-setters" in modern electric railway development.

The Kansas City, Kaw Valley & Western Ry. Co., have installed this equipment on their new modern center-entrance interurban cars.

One-piece arrangement of HL Control Units is particularly adaptable to restricted mounting space. Quadruple 306-CV, 65 H.P., 600 volt motors are especially popular for interurban work.

WESTINGHOUSE ELECTRIC

*Leaflet 3834 describes No. 306-CV Motor*



*Leaflet 3865 describes HL Control*

**Westinghouse Electric & Manufacturing Co., East Pittsburgh, Pa.**

**Sales Offices in All Large American Cities**

# Westinghouse

# ELECTRIC RAILWAY JOURNAL

H. W. BLAKE, Editor

VOLUME 50, No. 3 NEW YORK, JULY 21, 1917 PAGES 89 TO 130

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# The
# Westinghouse Bungalow Compressor

Is built up on a basic one-piece body casting of great strength which contains air cylinders, crank case, motor housing and all journal bearings.

Permanent and positive alignment of all bearings.

Absolute disappearance of reassembling troubles.

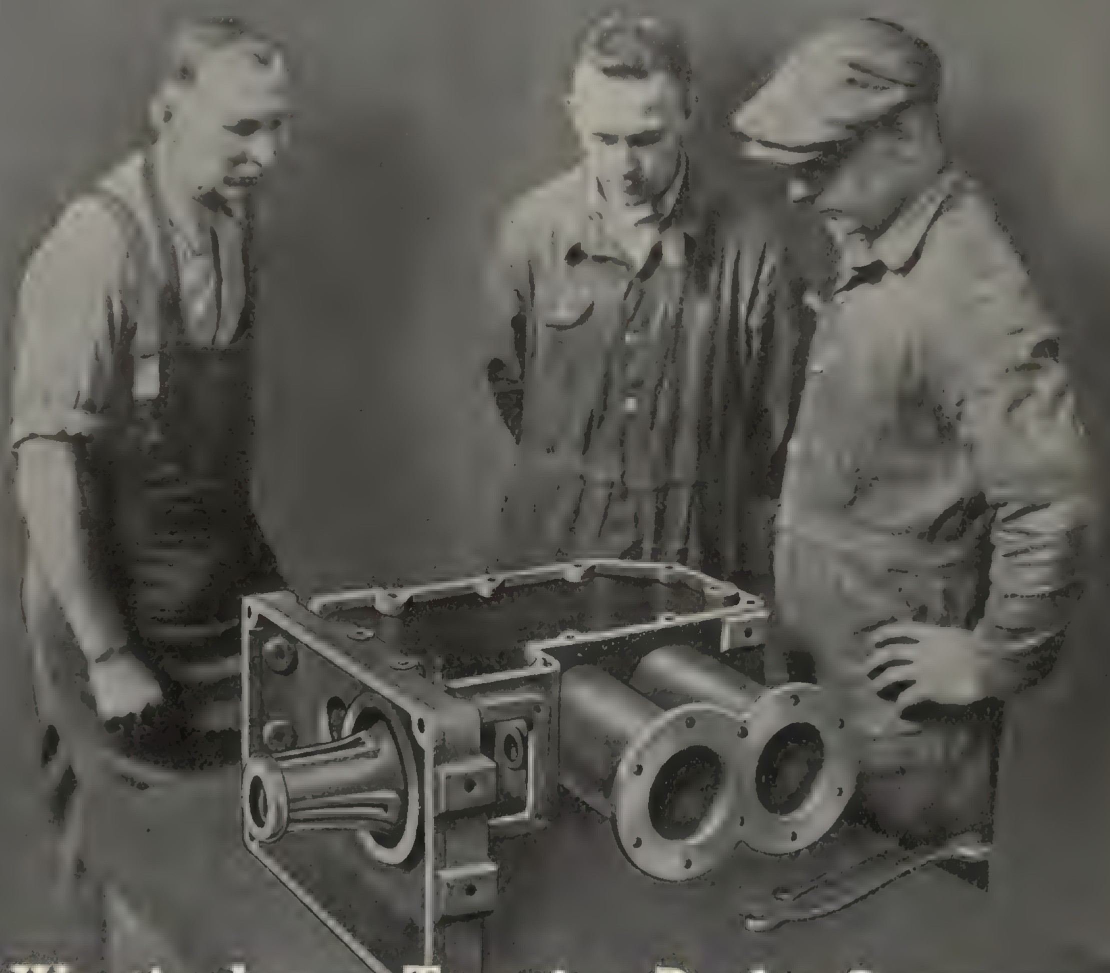
Combines greater simplicity and higher efficiency.

Decreases inspection and maintenance costs.

Capacities of 5, 10, 16, 38 and 50 cubic feet per minute.

For all classes of electric railway service.

Send for D.C. Unit T-2016.



## Westinghouse Traction Brake Company

General Offices and Works: Wilmerding, Pa.

Atlanta, Ga.
Boston, Mass.
Chicago, Ill.
Columbus, O.
Denver, Col.
Houston, Tex.
Los Angeles,
Mexico City
New York, N. Y.
Pittsburgh, Pa.
Seattle, Wash.
San Francisco,
St. Louis, Mo.
St. Paul, Minn.

TRADE MARK

# Westinghouse

## Type PS. Wet Process Porcelain Strain Insulators

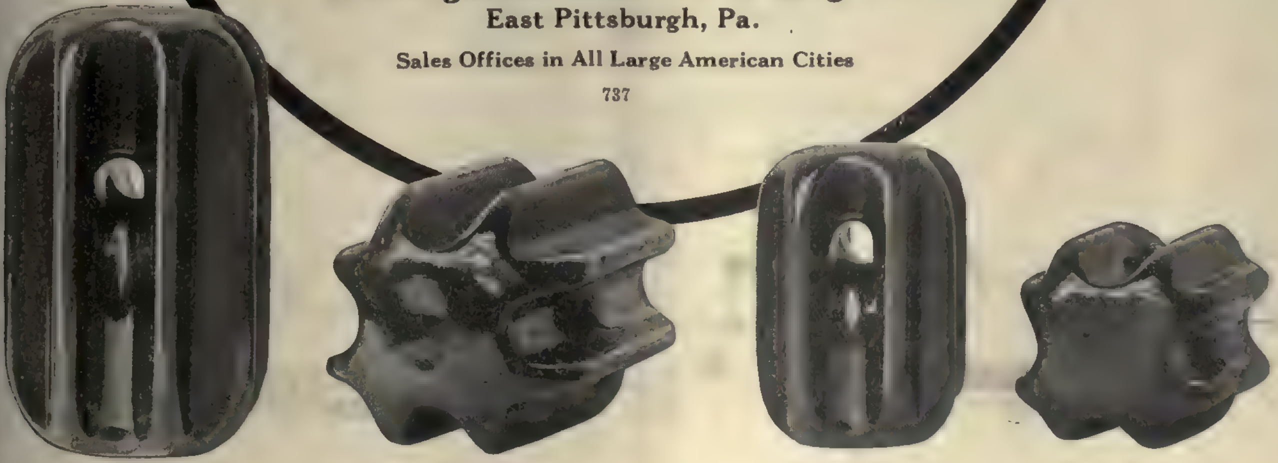
### For High-Voltage Service

PATENTED SEPTEMBER 22ND 1914 – PATENTED FEBRUARY 17TH 1917

The Type PS Insulators were recently purchased by the Chicago, Milwaukee & St. Paul R. R., to insulate the 3,000 Volt Trolley Wires on the Cascade Electrification of this steam railroad, between Spokane and Seattle, Washington.

**Westinghouse Electric & Mfg. Co.**
East Pittsburgh, Pa.
Sales Offices in All Large American Cities

737



Phono-Electric

For the World's
Greatest Freight Electrification

The Norfolk & Western combination of three-phase locomotives and single-phase distribution is one of the greatest feats in electrification annals.

Capacity and reliability were the prime objects of the engineers, for on this great coal road the capacity has been increased by permitting the use of electric locomotives capable of hauling a load of 3250 tons at a speed of 14 miles an hour up a 3 per cent grade.

Only the strongest, most dependable contact wire could be made standard for such work—and that's why the main line of this electrification is Phono-Electric.

Bridgeport Brass Company
Bridgeport Connecticut

2037

# There Is Security at This Crossing

At every unprotected steam road grade-crossing on your road there threatens an ever-imminent danger.

Usually the track is abnormally rough, usually the wire is abnormally high. So a grade-crossing is a quite likely place for the trolley wheel to leave the wire.

A car starts across. The wheel jumps. The conductor goes out to replace it. A train comes speeding around the curve. The conductor, suddenly nervous, fumbles with the rope. The passengers, panic-stricken, crowd through the door, break through windows—

## National Trolley Guard (Patented)

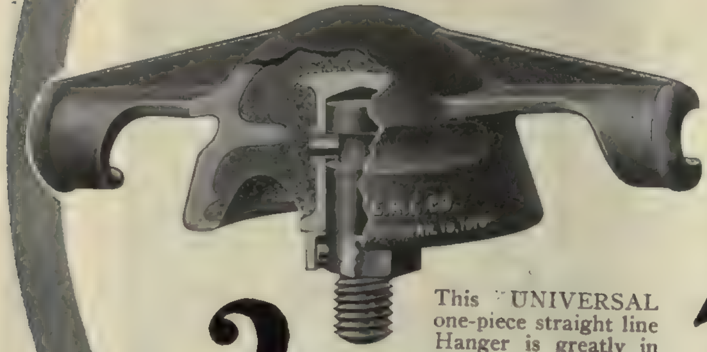
removes just such a possibility. It is made of open-wire mesh, shaped into an inverted trough. When the wheel jumps it is caught in the trough which furnishes power to carry car and passengers to safety. Over 100,000 feet in successful operation.

*Sold only by*

**The Ohio Brass Co., Mansfield, Ohio**

1

UNIVERSAL double curve Hanger, the only one-piece insulated pull-over now on the market. A great improvement over malleable iron yoke and separate insulators.



2

This UNIVERSAL one-piece straight line Hanger is greatly in advance of the old solid stud three-piece Hangers.
The revolving stud permits loss of ear to be drawn up tight against the Hanger face, relieving the threads from strain and insuring correct alignment of ear.

3

UNIVERSAL Hanger arranged for single curve pull-over.
The patented revolving stud permits line ears of any length to be attached to Hanger without the necessity of having removable arm as is required in similar Hangers with solid studs.

# CONSIDER

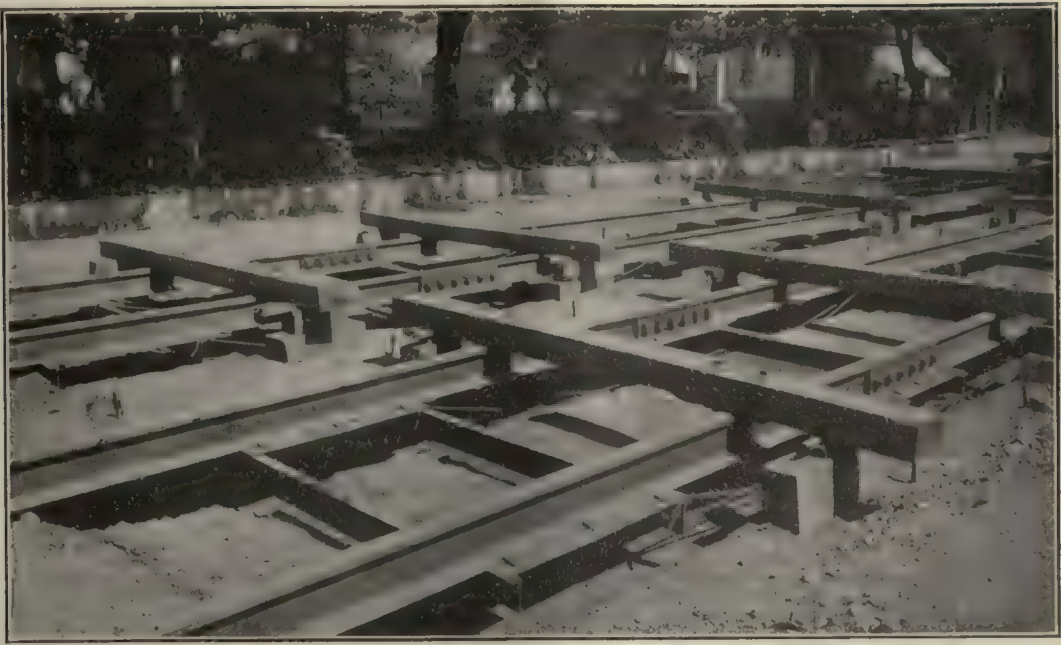
the Three UNIVERSAL Hangers shown on this page. They are worthy of your best attention.

They are one-piece Hangers, so that the disadvantages of the old three-piece Hangers are done away with.

Each Hanger has the revolving stud as an integral part of its construction. In your next order for trolley line material you'll specify these Hangers, especially if heavy suspension work on curves is to be undertaken.

Write now for further particulars.

**Electric Railway Equipment Co.**
**Cincinnati, Ohio**
**New York: 30 Church St.**



# No Maintenance Charges in Six Years of Service

# ON INTERNATIONAL STEEL TWIN TIES

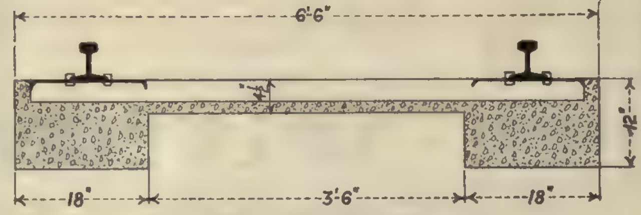
The heavy interurban rolling stock of the Sciota Valley Traction Company has been passing over a 9000-ft. section of Twin Tie track in Circleville, Ohio, for 6 years. This track is in perfect condition today, and not one cent has been spent for maintaining it. An enviable record for track which would have cost $10,000 more to build.

*This track cost only $4.30 per foot for all material and labor.* An unusually low figure, but the results in service have demonstrated that it was money well spent.

*Are you not spending more money for your track construction* than is absolutely necessary to obtain results equal to those on the Circleville track. Many companies have jumped from the cheapest to the most expensive form of track for paved streets.

*There is a happy medium and that is to be had by building with International Steel Twin Ties.* One-half the excavation, one-half the concrete and ballast and one-third as many ties. That's the answer for the low first cost. Large effective bearing area on 7 in. instead of the usual 6 in. of concrete below the ties accounts for the service results.

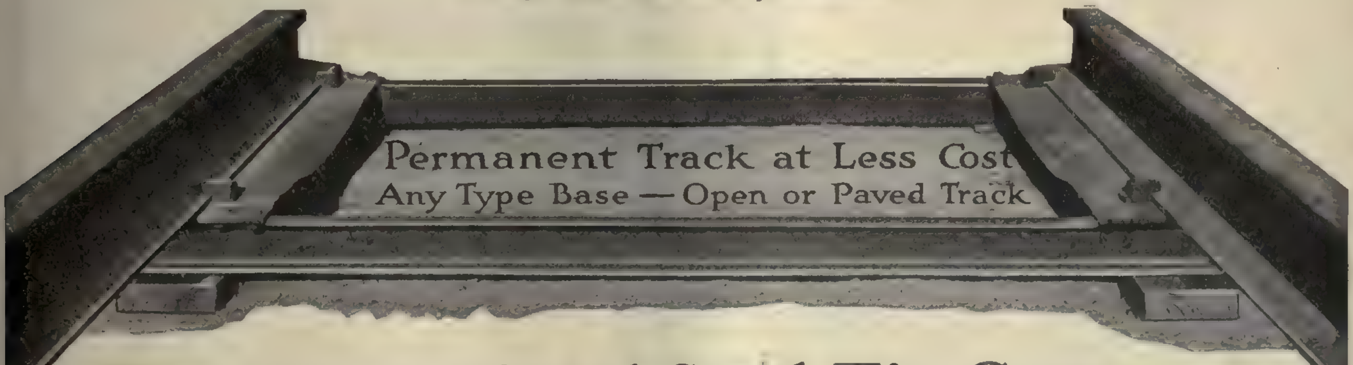
Let us demonstrate that fact to you. Order now while our stock of low-priced steel lasts. We can make unusually prompt deliveries.



840 cu. yds. per mile

**Type of Track Laid in Circleville, Ohio**

***Prompt deliveries made from stock***


Permanent Track at Less Cost
Any Type Base — Open or Paved Track

# The International Steel Tie Company

**Manufacturers of Steel Twin Ties and Crossing Foundations**

**General Sales Office and Works: Cleveland, Ohio**

REPRESENTATIVES:

Western Eng'g Sales Co.,
Los Angeles, Cal.

San Francisco, Cal.
Seattle, Wash.

R. J. Cooper Co.,
Salt Lake City, Utah.

J. E. Lewis & Co.,
Dallas, Texas.

Maurice Joy,
Philadelphia.

William H. Ziegler,
Minneapolis, Minn.

# Goldschmidt Thermit Company

**120 Broadway, New York**

329-333 Folsom St., San Francisco
103 Richmond St., W., Toronto, Ont.
7300 So. Chicago Ave., Chicago

# COMPROMISE WELDS

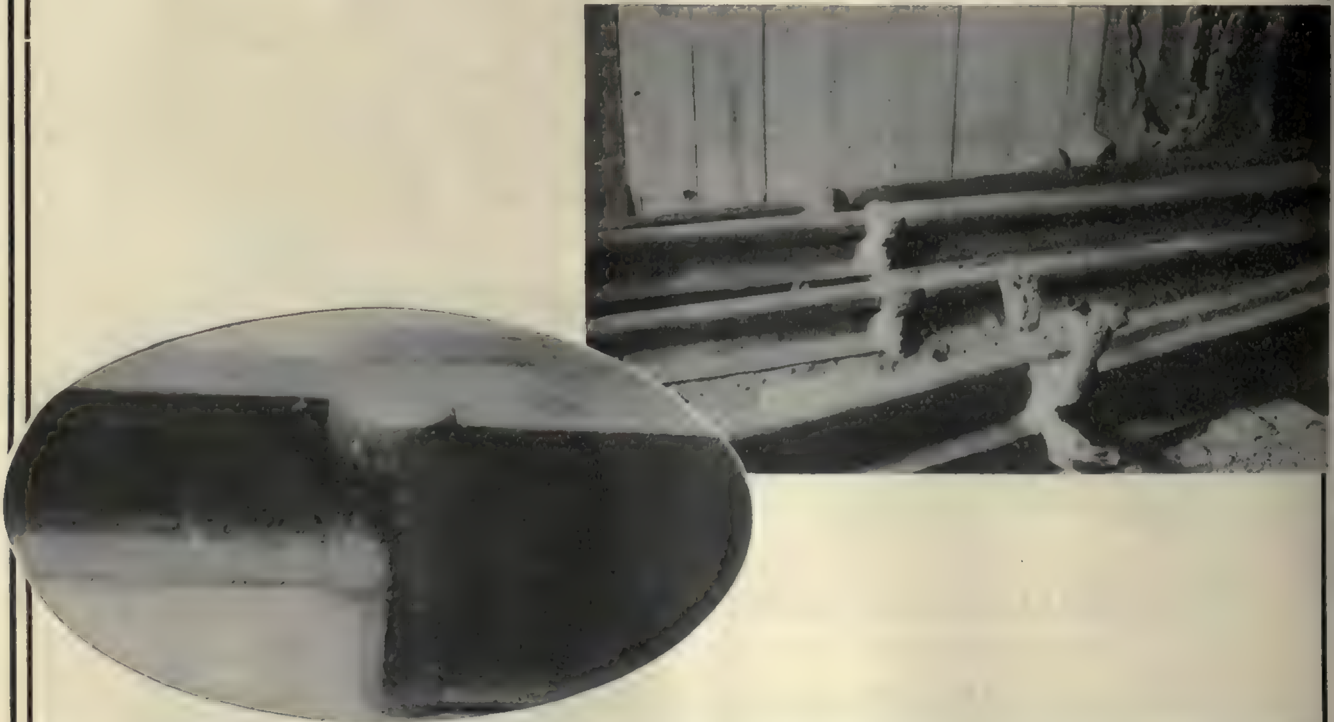
Truly "compromise" is a strange word to find its way into a Thermit weld advertisement, for never were welds *LESS* Compromising than these.

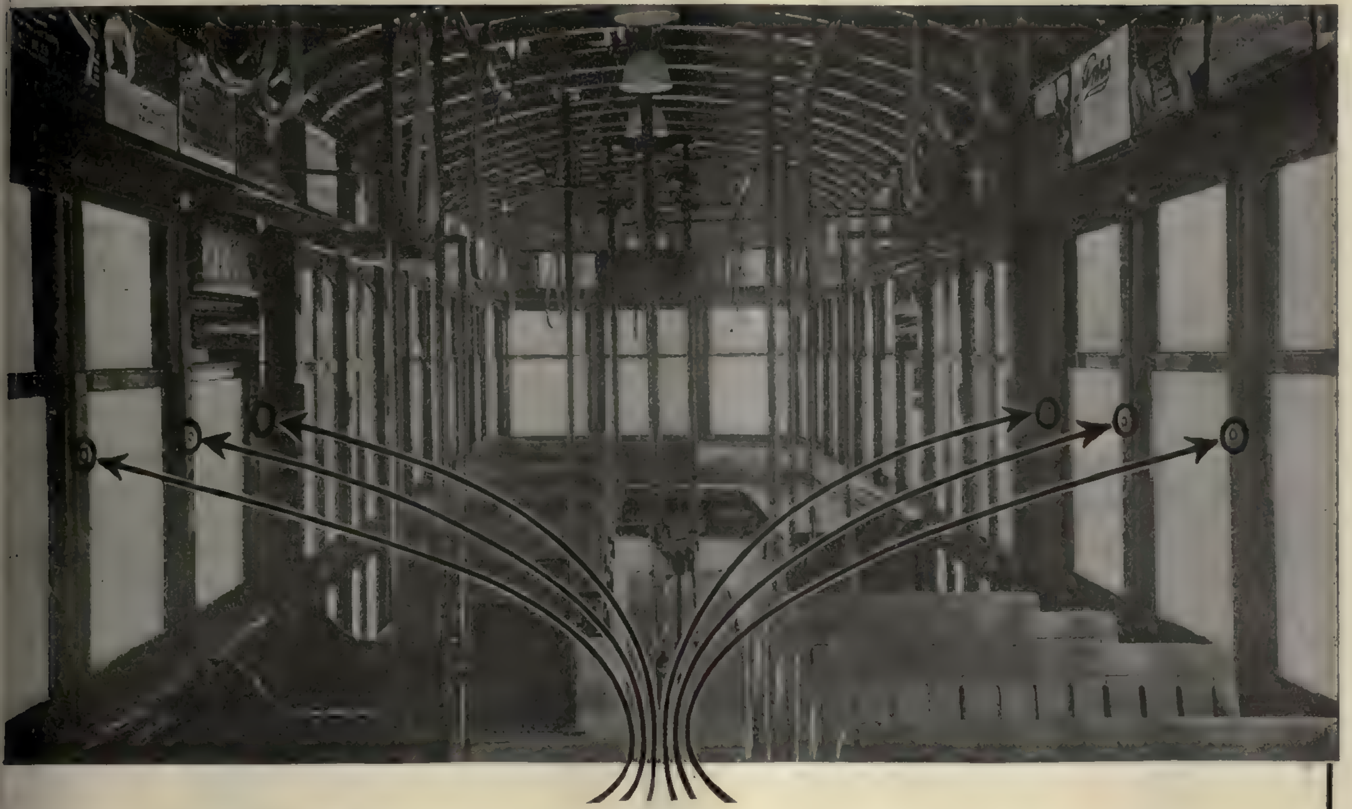
Thermit Insert Welds positively make continuous rail—there is no compromise—the rail is welded, and permanently proof against electrolytic waste and power losses through high resistance joints.

The picture below shows the highly successful "compromise" welding of 70 lb. "T" rail and 73 lb. groove rail.

Many gangs make 35-40 welds in a day using the standard Thermit outfit, a Bulletin on which we would like to send you.

# MEAN THERMIT WELDS





## *A good way to secure better public relations*

and give better service is to install Faraday High Voltage Car Signals. They offer a system which unfailingly conveys the passenger's wish to alight without embarrassment or confusion. No car is complete without

## *Faraday High Voltage Car Signals*

No. 19403 High Voltage Buzzer

No. 19405 Push Button

No. 19402 Resistance Panel

They consist only of a resistance, buzzer and push-buttons, as illustrated, and operate directly off the line voltage. All parts are failure-proof and of approved design.

Railways the country over are installing Faraday Signals on both old and new cars.

Your chance to score a bull's-eye for better public relations. Write for further information.

## ELECTRIC SERVICE SUPPLIES CO.

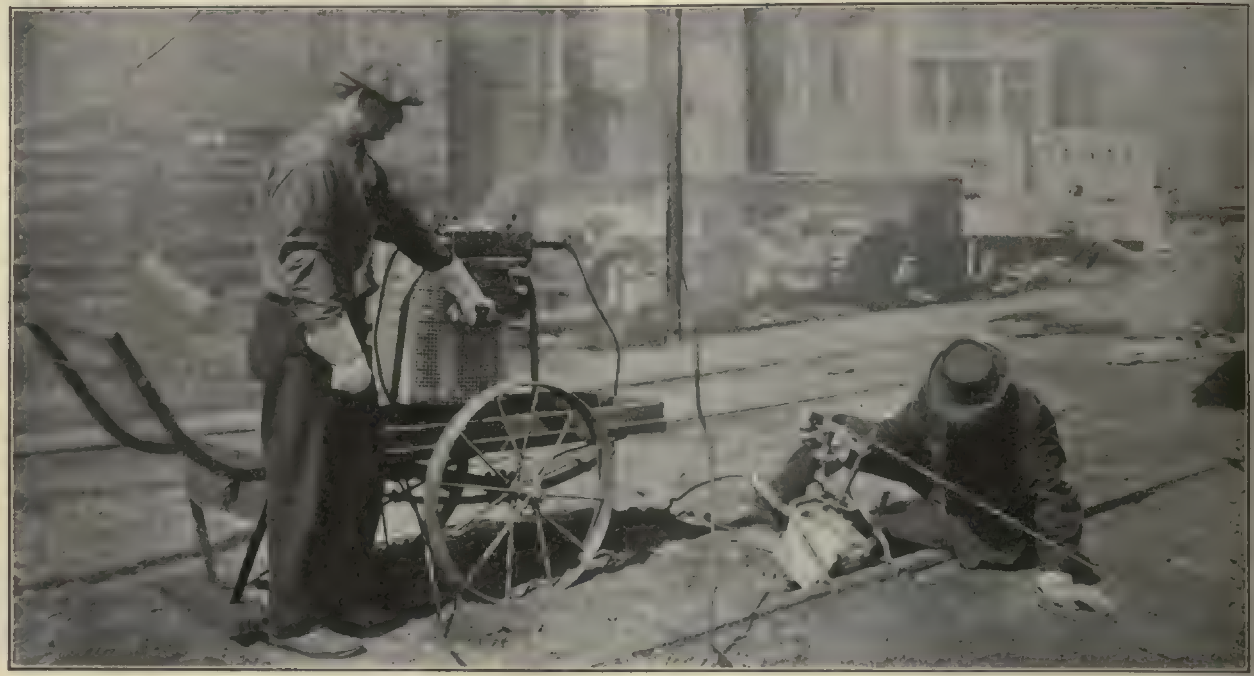
*Manufacturer of Railway Material and Electrical Supplies*

**PHILADELPHIA**
**17th and Cambria Sts.**

**NEW YORK**
**50 Church St.**

**CHICAGO**
**Monadnock Bldg.**

**Canadian Distributors: Lyman Tube & Supply Co., Ltd., Montreal, Toronto**



# Here's One Way of Mounting The Erico Portable Welder

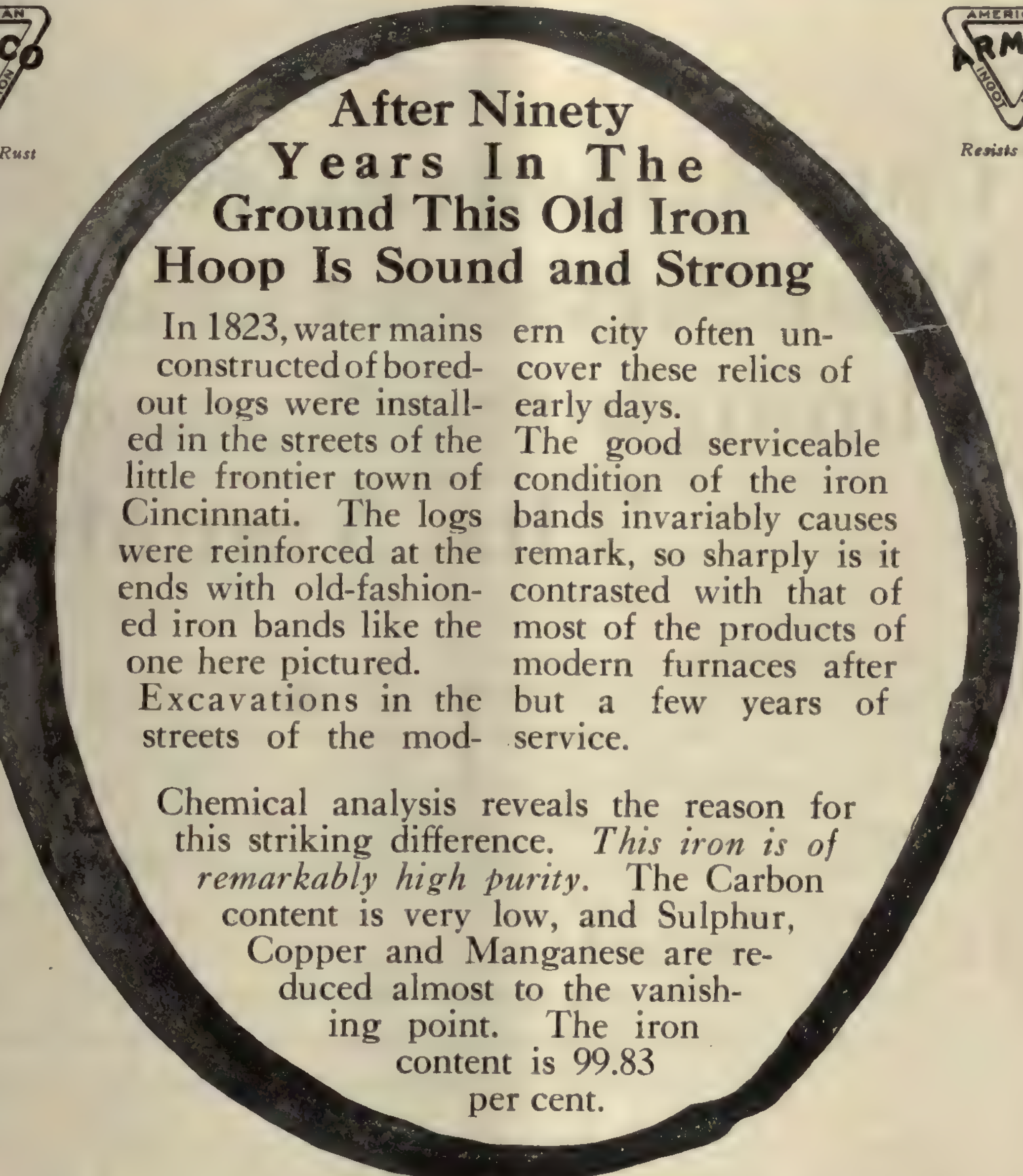
**ERICO**
THE LINE OF LEAST RESISTANCE

It shows one of our mounts in active use, as devised for a prominent electric railway for operation in city streets.

Three men are used to secure maximum output—one switchman to regulate the rheostat, one bonder and one grinder.

Two men, or even one man, if necessary, will suffice in cases where only a few replacements are called for.

**The Electric Railway Improvement Co.**
**Cleveland, Ohio**



AMERICAN ARMCO INGOT IRON

*Resists Rust*

AMERICAN ARMCO INGOT IRON

*Resists Rust*

## After Ninety Years In The Ground This Old Iron Hoop Is Sound and Strong

In 1823, water mains constructed of bored-out logs were installed in the streets of the little frontier town of Cincinnati. The logs were reinforced at the ends with old-fashioned iron bands like the one here pictured.

Excavations in the streets of the modern city often uncover these relics of early days.

The good serviceable condition of the iron bands invariably causes remark, so sharply is it contrasted with that of most of the products of modern furnaces after but a few years of service.

Chemical analysis reveals the reason for this striking difference. *This iron is of remarkably high purity.* The Carbon content is very low, and Sulphur, Copper and Manganese are reduced almost to the vanishing point. The iron content is 99.83 per cent.

# "ARMCO" IRON RESISTS RUST

because the rust-forming impurities are reduced to the lowest point commercially possible. It is guaranteed **at least 99.84% pure iron**. Every phase of its production is governed by the utmost care and skill. Purity, Evenness and Density are now as always the qualities of Durable Iron. In these "Armco" Iron is the nearest approach to perfection.

"Armco" (American Ingot) Iron is the logical material for Roofs, Pipes, Culverts, Flumes, Tanks, Signs and exposed metal work in general.

Write or 'phone the nearest manufacturer.

**Arkansas, Little Rock**
Dixie Culvert & Metal Co.
**California, Los Angeles**
California Cor. Culvert Co.
**California, West Berkeley**
California Cor. Culvert Co.
**Colorado, Denver**
R. Hardesty Mfg. Co.
**Delaware, Clayton**
Delaware Metal Culvert Co.
**Florida, Jacksonville**
Dixie Culvert & Metal Co.
**Georgia, Atlanta**
Dixie Culvert & Metal Co.
**Illinois, Springfield**
Illinois Corrugated Metal Co.
**Indiana, Crawfordsville**
W. Q. O'Neall Co.
**Iowa, Des Moines**
Iowa Pure Iron Culvert Co.
**Iowa, Independence**
Independence Culvert Co.
**Kansas, Topeka**
The Road Supply & Metal Co.
**Kentucky, Louisville**
Kentucky Culvert Mfg. Co.
**Louisiana, New Orleans**
Dixie Culvert & Metal Co.
**Maryland, Munsey Bldg., Baltimore.** Wm. M. Baker.
**Massachusetts, Palmer**
New England Metal Cul. Co.
**Michigan, Bark River**
Bark River Bridge & Cul. Co.
**Michigan, Lansing**
Michigan Bridge & Pipe Co.
**Minnesota, Minneapolis**
Lyle Corrugated Culvert Co.
**Minnesota, Lyle**
Lyle Corrugated Culvert Co.
**Missouri, Moberly**
Corrugated Culvert Co.
**Montana, Missoula**
Montana Culvert & Flume Co.
**Nebraska, Lincoln**
Lee-Arnett Co.
**Nebraska, Wahoo**
Nebraska Culvert & Mfg. Co.
**Nevada, Reno**
Nevada Metal Mfg. Co.
**New Hampshire, Nashua**
Northeast Metal Culvert Co.
**New Jersey, Flemington**
Pennsylvania Metal Cul. Co.
**New York, Auburn**
Pennsylvania Metal Cul. Co.
**North Dakota, Wahpeton**
No'western Sheet & Iron Wks.
**Ohio, Middletown**
American Rolling Mill Co.
The Ohio Corrugated Culvert Co.
**Oklahoma, Shawnee**
Dixie Culvert & Metal Co.
**Oregon, Portland**
Coast Culvert & Flume Co.
**Pennsylvania, Warren**
Pennsylvania Metal Cul. Co.
**South Dakota, Sioux Falls**
Sioux Falls Metal Culvert Co.
**Tennessee, Nashville**
Tennessee Metal Culvert Co.
**Texas, Dallas**
Wyatt Metal Works.
**Texas, El Paso**
Western Metal Mfg. Co.
**Texas, Houston**
Lone Star Culvert Co.
**Utah, Woods Cross**
Utah Corrugated Culvert & Flume Co.
**Virginia, Roanoke**
Virginia Metal Culvert Co.
**Washington, Spokane**
Spokane Cor. Cul. & Tank Co.
**Wisconsin, Eau Claire**
Bark River Bridge & Cul. Co.

**Canada—Canada Ingot Iron Co., Ltd., Guelph, Sherbrooke, Winnipeg, Calgary.**

Can Railways Give More Service at Less Cost Through the Equipment That You Make?

In the **September 22** issue of the Electric Railway Journal leading railway men and the editorial staff of the Electric Railway Journal will tell how electric railways in different parts of the country are increasing their service at a reduction in operating expense, thereby achieving larger gross and larger net earnings.

To a considerable degree this increase in business, despite adverse conditions, is due to the employment of labor-saving and comfort-making equipment.

If you are manufacturing equipment of this kind you certainly will want to describe it fully in this issue;

Or if you have economy devices to suggest, you will just as certainly want to use this exceptional opportunity to present your story—

For never before in its history has the electric railway industry had such need for "More Service at Less Cost" equipment than now.

ELECTRIC RAILWAY JOURNA

Member of Audi

# More Business for the Manufacturer

**Will be the natural consequence of the "More Service at Less Cost" policy that must soon be adopted by the electric railways of the United States and Canada.**

**Our editors, who have made a most complete analysis of the present operating situation, say:**

> ........"In view of these facts, we have decided that it would be appropriate for us to modify the form in which our usual 'Convention Number' is published. Instead of a special number, we shall issue an enlarged regular issue somewhat similar in appearance to our maintenance issue. It will be dated Sept. 22. The special subject to be discussed in this number is how electric railway companies can best improve their service at a reduced cost. It will be a 'More Service, Less Cost' issue, and we promise that for the interest of its contents it will equal or exceed any Convention Issue which we have published in previous years."

**Here is the biggest chance of the year for you, as a manufacturer of electric railway equipment and materials, to tie up your sales story with the effective work of our editors. Every reader of Electric Railway Journal will be primed for this issue.**

***Regular rates will be in order.* Make up your mind now to use two, four, six or eight pages. Tell us, and we'll prepare for you timely copy that could be made up only from the intensive study that we have been conducting of every angle of the operating and manufacturing conditions of the field.**

**9 WEST 39th STREET, N. Y. CITY**

ulations

## Here Are Figures Showing the Economical Performance of the

# Reciprocating Track Grinder

In last week's advertisement we quoted some extracts from an address by Mr. B. R. Brown, Superintendent Maintenance of Way, Dallas Railways Company, in which Mr. Brown spoke in a general way on the efficiency of the Reciprocating Track Grinder.

Mr. Brown in his address also gave some specific data showing the results achieved during a year's experience with the Reciprocating Grinder, and we take the liberty of further quoting the figures he gave as follows:

> "From the first of May, 1916, until January 1st, 1917, a total of 2,410 joints were planed to a true surface at a total cost of $854.28, or an average of 35 cents per joint. This included labor, oil, tools, grinder blocks and repairs, or on a basis of a mile of track, figuring sixty rails, an average cost of $61.60 per mile. Joints should be replaned at least every 18 months to two years. If we start with the new track and keep the joints planed we will increase the life of the track from 15 to 40 per cent, and at the same time will effect a saving of the cost of making repairs, which will be necessary if the track is allowed to just 'run along.' This is true of bolted joints as it is of welded joints, for if the cup is kept out of the joints the bolts will not so quickly become loose, and the joint will remain intact.
>
> "On one piece of track that has been operated over three years, 378 joints were planed at an average cost of 13½ cents per joint. Certainly a good investment. There were only three or four joints on this street that had started working loose, but they all showed a slight cupping.
>
> "One of the more expensive jobs, per joint, was on track seven years old, and all operated over by our heaviest city traffic. On account of the traffic this work was done at night. At a total cost of $134.69, a total of 303 joints were planed; a cost per joint of 44½ cents. This work was done in July, 1916, and to date these joints show no signs of the returning of the cupping, and the track is in excellent condition.
>
> "On corrugation grinding the Reciprocating Grinder has been just as efficient. Our cost records show the cost of removing corrugations to vary from 2½ cents to 3½ cents per foot, depending upon the depth of the corrugations and traffic conditions."

The experience of the Dallas Company with the Reciprocating Grinder is in harmony with the experience of many other companies all over the world.

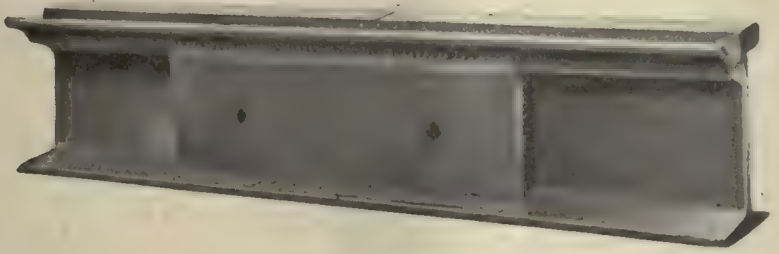
You can try out a Reciprocating Grinder on your tracks at our expense.

**Railway Track-work Company**

**30th and Walnut Streets, Philadelphia, U. S. A.**

## *What Is the*

# Gailor Welded Rail Joint?



It is a welded rail joint which, with the use of special apparatus, can be applied in about **one-quarter** the time required with any other method of arc welding. It is the **only** welded joint thoroughly protected by patents which affords a continuous weld, top and bottom, and which supports the head of the rail for the entire length of the plates.

Aside from its patented features and the speed of application, the Gailor welded rail joint is the only one that is applied with a unit-type motor-generator operated at more than 85% electrical efficiency.

**The cost of the Gailor welded rail joint, as installed, is less than that of any practicable combination of mechanical joint and electrical bond.**

These features, all of which are exclusive to the Atlantic method of welding, make the use of the Gailor Welded Rail Joint especially attractive to railways which are seeking a **permanently continuous rail.**

We invite you to write for particulars regarding the installation of Gailor Welded Rail Joints under our licensing plan.

AWCo
Trade Mark

ATLANTIC WELDING
COMPANY
30 CHURCH STREET
NEW YORK

# Why the Hale and Kilburn Corner Grip Handle?

The patented type of grip handle common to Hale and Kilburn seats for city and suburban cars is but one of many reasons for making Hale and Kilburn seats your standard.

Note that this corner grip handle is formed by a continuation of the seat back contour, thus permitting the most symmetrical, least conspicuous and strongest construction possible—

Instead of using clumsy loops on the top of the seat or brazing or soldering the corner handle to the back band.

## Accidents are Prevented

because the passenger does not have to twist or distort his hand in taking hold, thus preventing broken fingers or wrists, due to sudden lurching of the car.

In short, the Hale and Kilburn corner grip handle is

Most Serviceable,
Most Durable
Best Looking,
and Safest

*Pioneers in Steel Trim for Passenger Cars, including interior finish, steel doors, etc.*

**Hale and Kilburn Co.**

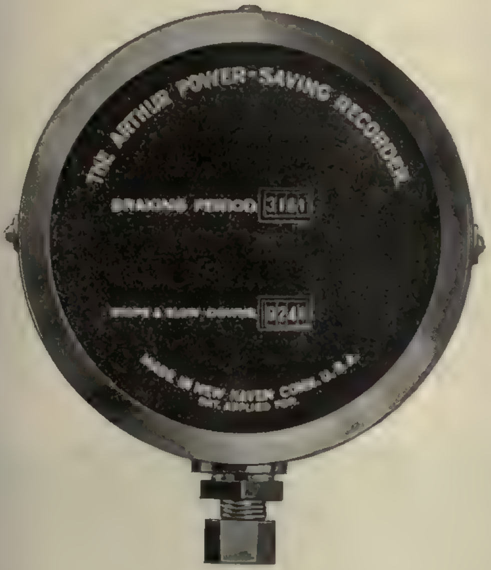
Philadelphia
Washington

New York
Atlanta

Chicago
San Francisco

# Twelve things you would like to have your motormen do

Showing recorder location on one of the cars of the Connecticut Company.


THE ARTHUR POWER-SAVING RECORDER
BRAKING PERIOD
MADE IN NEW HAVEN CONN. U.S.A.
PAT. APPLIED FOR

(1) Coast more.
(2) Avoid unnecessary stops and slowdowns.
(3) Release brakes early after stopping on level track.
(4) Save power, brake shoes, and wheel tires.
(5) Start and stop smoothly.
(6) Maintain proper headway.
(7) Avoid running at too high speed.
(8) Guard against rear-end collisions.
(9) Lessen the number of derailments.
(10) Report defects promptly—particularly defective brakes.
(11) Use hand brakes occasionally—enough to keep this safety feature in good working order.
(12) Operate cautiously and safely.

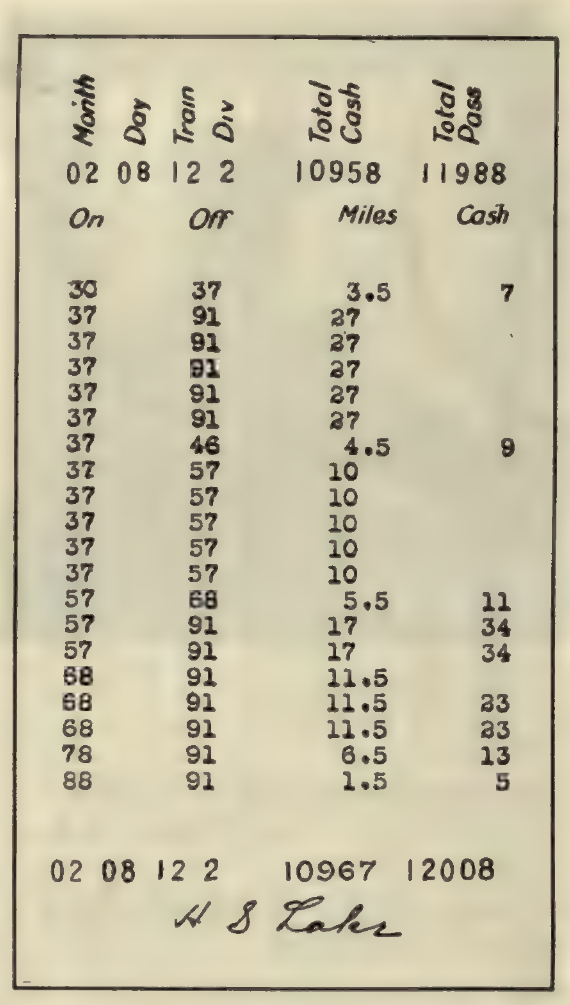
**Equipment of your cars with the**

# Arthur Power-Saving Recorder

followed by intelligent interpretation to your men of the meaning of the records established and suggestions for making better records will rapidly educate your motormen to do these things. Big economies and greater safety will result.

**The Arthur Power-Saving Recorder Co.**
New Haven, Conn.

*"Power wasted at the brake shoes is the true measure of the motormen's relative efficiency."*



| Month | Day | Train | Div | Total Cash | Total Pass |
|---|---|---|---|---|---|
| 02 | 08 | 12 | 2 | 10958 | 11988 |

| On | Off | Miles | Cash |
|---|---|---|---|
| 30 | 37 | 3.5 | 7 |
| 37 | 91 | 27 | |
| 37 | 91 | 27 | |
| 37 | 91 | 27 | |
| 37 | 91 | 27 | |
| 37 | 91 | 27 | |
| 37 | 46 | 4.5 | 9 |
| 37 | 57 | 10 | |
| 37 | 57 | 10 | |
| 37 | 57 | 10 | |
| 37 | 57 | 10 | |
| 37 | 57 | 10 | |
| 57 | 68 | 5.5 | 11 |
| 57 | 91 | 17 | 34 |
| 57 | 91 | 17 | 34 |
| 68 | 91 | 11.5 | |
| 68 | 91 | 11.5 | 23 |
| 68 | 91 | 11.5 | 23 |
| 78 | 91 | 6.5 | 13 |
| 88 | 91 | 1.5 | 5 |

02 08 12 2 10967 12008

H S Lake

# Here's how

## *the Bonham Traffic Recorder distinguishes cash from paper fares*

The cash fares are shown in solid figures; the tickets and passes by gaps in the same column.

These gaps may be gaps in your **revenue** if your passes are excessive or your ticket fares too low.

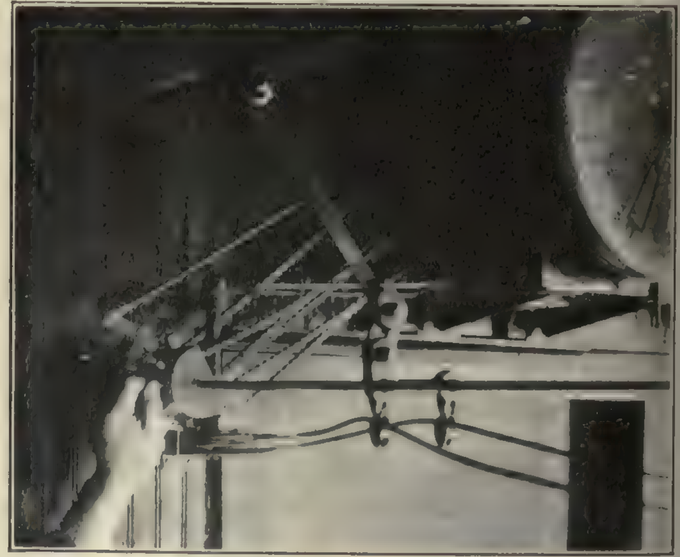
The Bonham Traffic Recorder, in addition to the exclusive feature of showing MILEAGE PER PASSENGER, thus enables you also to analyze cash versus paper income.

This analysis can be made not only upon the basis of trip comparisons, but also on the basis of origin of passengers. In other words, you can determine not only at what times of the day certain classes of riders predominate but also between what points such riders are most common.

By a very simple operation, also, half-fares are registered as such and identified by an "H" on the record sheet.

The value of so graphic a record as this in discussing changes in fare before a regulatory body needs no emphasis. It is as an open book to both the layman and the railway operator.

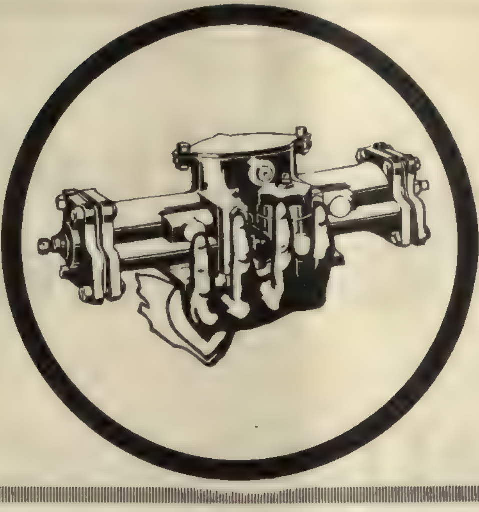
Why not use the easiest and most accurate way available—the Bonham Traffic Recorder—for determining how much of your revenue is affected by reduced rate tickets and free riding?



The conductor can lock the Bonham Traffic Recorder against unauthorized use.

# The Bonham Recorder Co.

Hamilton, Ohio



BRAIN
OR
BRAWN

National Pneumatic Door and Step Control has made it possible for you to place brain before brawn in the selection of your men, conductors especially.

You know better than we that an essential factor in handling your patrons to their satisfaction is a courteous conductor.

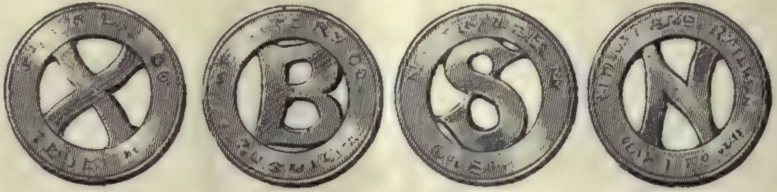
When you put National Pneumatic Door and Step Control on your cars you greatly increase the chance to get and hold **platform gentlemen.**

And you will be pleasantly astonished, as other operators have been, at the improvement in the men you have on the job today.

NATIONAL PNEUMATIC COMPANY

50 Church St. New York

515 Laflin St. Chicago



# The RIGHT Kind of Token MUST Be the Basis

of **any** metal ticket fare collection system. It must be a token which cannot easily be counterfeited, and which does not resemble United States coinage too closely; yet it must also be neat, distinctive and durable.

# The Johnson Metal Ticket System

is based upon long and successful experience in the design, manufacture and handling of metal ticket-tokens.

One type of token, illustrated here, is cut through in the center with an initial, company symbol or other distinctive identification. Our tokens are made in two sizes—one midway between penny and nickel, and the other midway between the American dime and Canadian 5-cent piece.

Remember, these metal tokens are extremely hard to counterfeit—and the Johnson Fare Box counts them just as accurately and as quickly as cash fares.

**Johnson Fare Box Company**
**Jackson Boulevard and Robey St., Chicago**
**50 East 42nd Street, New York**

# 11% Saving in Energy

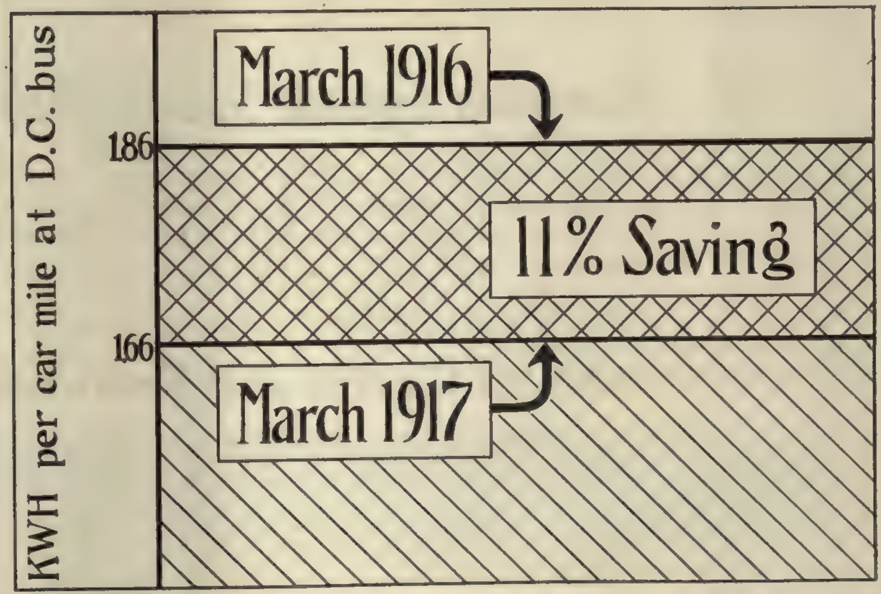
on the cars of

# The Southern Public Utilities Co.

by using

# Economy Meters

First reports from the installation of 26 Sangamo Economy Meters on the Greenville cars of the Southern Public Utilities Co. show that the kilowatt hours per car mile were reduced from 1.86 in March, 1916 (before meters were installed), to 1.66 in March, 1917 (after Economy meters were installed).

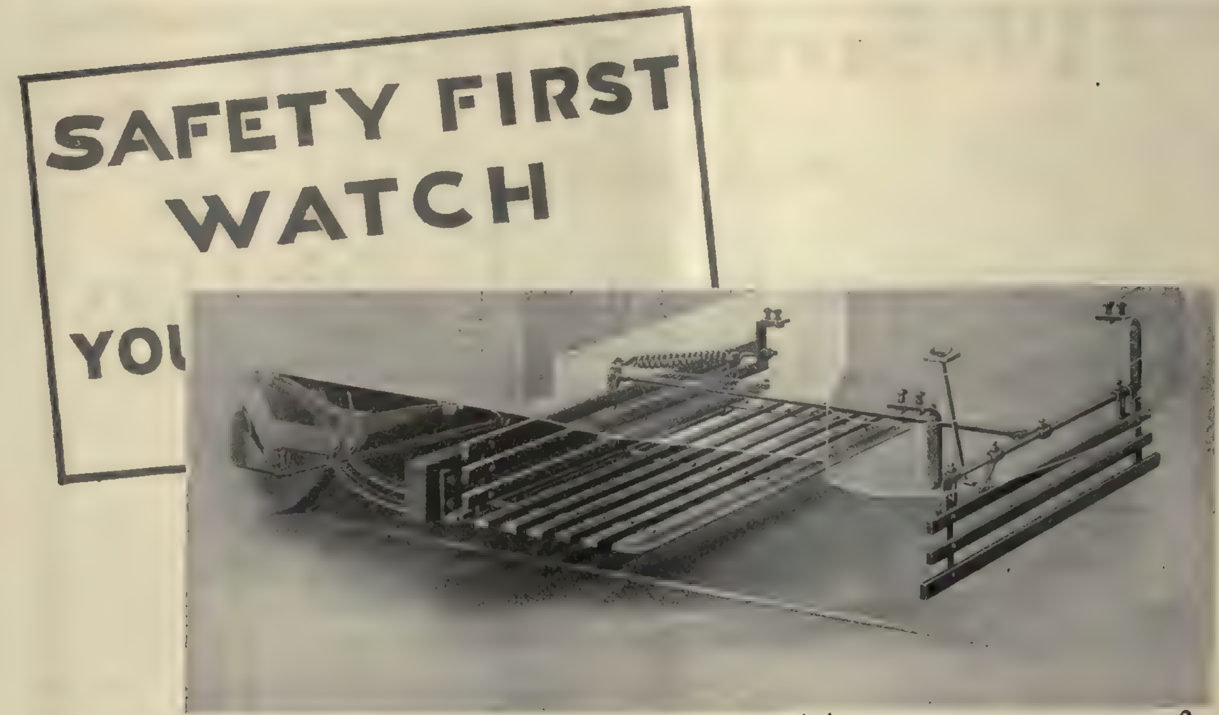


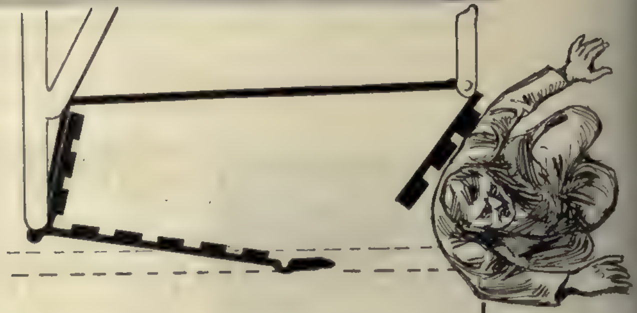
**YOU** can get this same economy on your lines. Figure for yourself what 11% power saving will mean in dollars on your road.

**ECONOMY**
SANGAMO
BUILT LIKE A WATCH
**METERS**

**Sangamo Electric Company**
**Springfield, Illinois**

**Specialists in Meters for Every Electrical Need**





# Actions speak louder than words

Every moment of the cars' working, H-B Life Guards and Providence Fenders will be on duty, waiting to SAVE the life and limb of those thoughtless ones to whom no amount of "SAFETY FIRST" talk will ever teach common sense.

For this particular service

## H-B Life Guards and Providence Fenders

are made; that is the sole reason for their existence.

Think of the relief to the motormen, and YOUR freedom from annoying accident claims—for it has been repeatedly proven in actual service that H-B Life Guards and Providence Fenders make accidents into nothing more than a few bruises and a good scare.

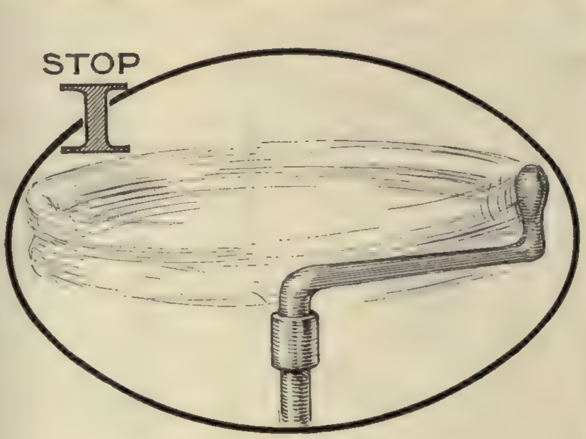
Is it not then saving much money and pleasing the public to fit these guards standard on every car?

**The Consolidated Car Fender Co.**
Providence, R. I.

General Sales Agent
**Wendell & MacDuffie Co.**
61 Broadway, N. Y.

12 STOPS
On the Road to Better Braking

## Stop the "flying handle" menace



Your claim agent will be quick to recognize this big feature of

## HORNE DOUBLE-ACTING BRAKE

How many of your motormen are temporarily disabled by being struck by a released brake handle? You can eliminate the hazard to your public too, when passing the motorman to alight.

Safety commissions may some day get after this real danger.

Beat them to it!

Horne Double-Acting Brakes are pedal released. There's no swing from the handle.

## HORNE SPECIALTIES

- Horne Double Acting Brakes
- Giant Geared Brakes
- Differential Staffless Brakes
- Sterling Safety Brakes
- Sterling Trolley Bases
- Sterling Sand Boxes
- Air Rectifiers, eliminating frozen brake piping
- Q-P Trolley Catchers
- Lord Screenless Air Cleaners for Compressors
- Hydrogrounds and Lightning Arresters
- Fenders and Wheelguards
- Controller Fingers
- Friction and Rubber Tape
- Packing and Gaskets
- Air Hose and Rubber Specialties

**Horne Manufacturing Co.**

50 Court St., Brooklyn, N. Y.

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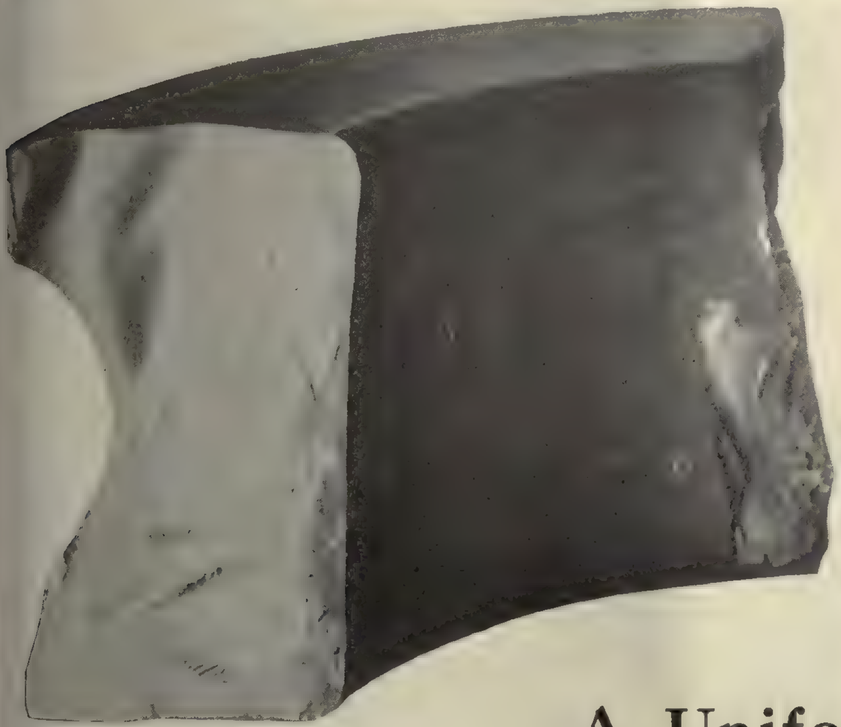
QUALITY
Mark

**The Tool Steel Gear & Pinion Co.**
**Cincinnati, O.**

# HESS-BRIGHT

PHILADELPHIA



Insuring
the
Uniform Quality
of Every
Hess-Bright
Ball Bearing

## A Uniformly Hardened Ring Throughout—From Surface to Center

Immediately after hardening, at least one out of each lot of rings is broken to examine the structure of the entire cross-section. The force applied to fracture the ring is no longer recorded—it is invariably many times in excess of any loading the ring could receive in use.

The object of this test, however, is told by the photograph—showing a typical fracture. The smooth texture and dense grain verify the thoroughness of the hardening—not alone on the surface but over the entire cross-section of the ring.

That checking of the results of each hardening operation maintains uniform strength in the rings of every Hess-Bright Ball Bearing—the strength that successfully withstands long-continued, heavy loading.

*Hess-Bright's Conrad Patents are thoroughly adjudicated*

# Columbia Brake Levers

## No. 4 Rounding the Ends

The ends having been squared off close to the chalk line made 'round the template, the brake lever is brought to another press where the ends are sheared to the desired arc.

Now the brake lever is ready for drilling.

Speaking of cars—and car maintenance, too—how about these standard articles and tools?

TOOLS

- Armature and Axle Straighteners
- Armature shaft straighteners
- Armature buggies and stands
- Babbitting molds
- Banding and heading machines
- Car hoists
- Car replacers
- Coil taping machines for armature leads
- Coil winding machines
- Pinion pullers
- Pit jacks
- Signal or target switches
- Tension stands

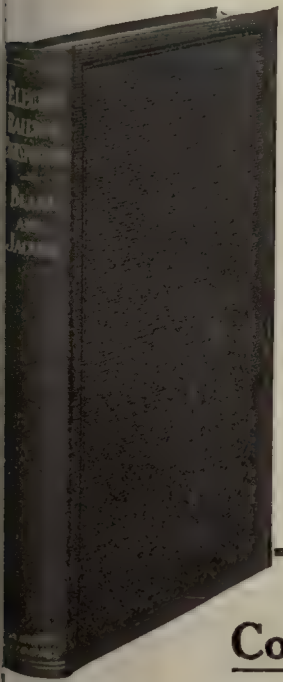
CAR EQUIPMENT

- Armature and Axle Bearings
- Armature and field coils
- Bearings (Axle and Armature)
- Brush-holders and brush-holder springs
- Brake, door and other handles
- Brake forgings, riggings, etc.
- Car trimmings
- Commutators
- Controller handles
- Forgings of all kinds
- Gear cases (steel or mall. iron)
- Grid resistors
- Third-rail shoe beams and accessories
- Trolley poles (steel) and wheels

**Columbia Machine Works & Malleable Iron Co.**

Atlantic Ave. and Chestnut St., Brooklyn, N. Y.

W. R. Kerschner Co., Inc., N. Y. Holden & White, Inc., Chicago F. F. Bodler, San Francisco



# This New Book Shows the Way to Better Methods and Increased Earnings for Electric Railways

It emphasizes the close relation between efficient transportation methods and financial success.

It covers the important recent developments in transportation methods and shows clearly their effect on earnings.

## Contents

Chapter Headings.—I. Organization and Definitions. II. Adjustment of Service to Traffic. III. Accelerating Traffic Movement along the Line. IV. Accelerating Traffic Movement on the Car. V. Car Types in Relation to Traffic. VI. City Timetables—Preliminaries. VII. Interurban Schedules and Dispatching. VIII. Fares. IX. Fare Collection Practices and Devices. X. Public Relations. XI. Promotion of Passenger Traffic. XII. Traffic Signs for Cars, Station and Road—Information for the Public. XIII. Competition. XIV. Freight and Express Business. XV. Selection and Training of Men. XVI. Wages and Wage Agreements. XVII. Welfare Work. XVIII. Discipline of Trainmen. XIX. Forms of Extra Pay.

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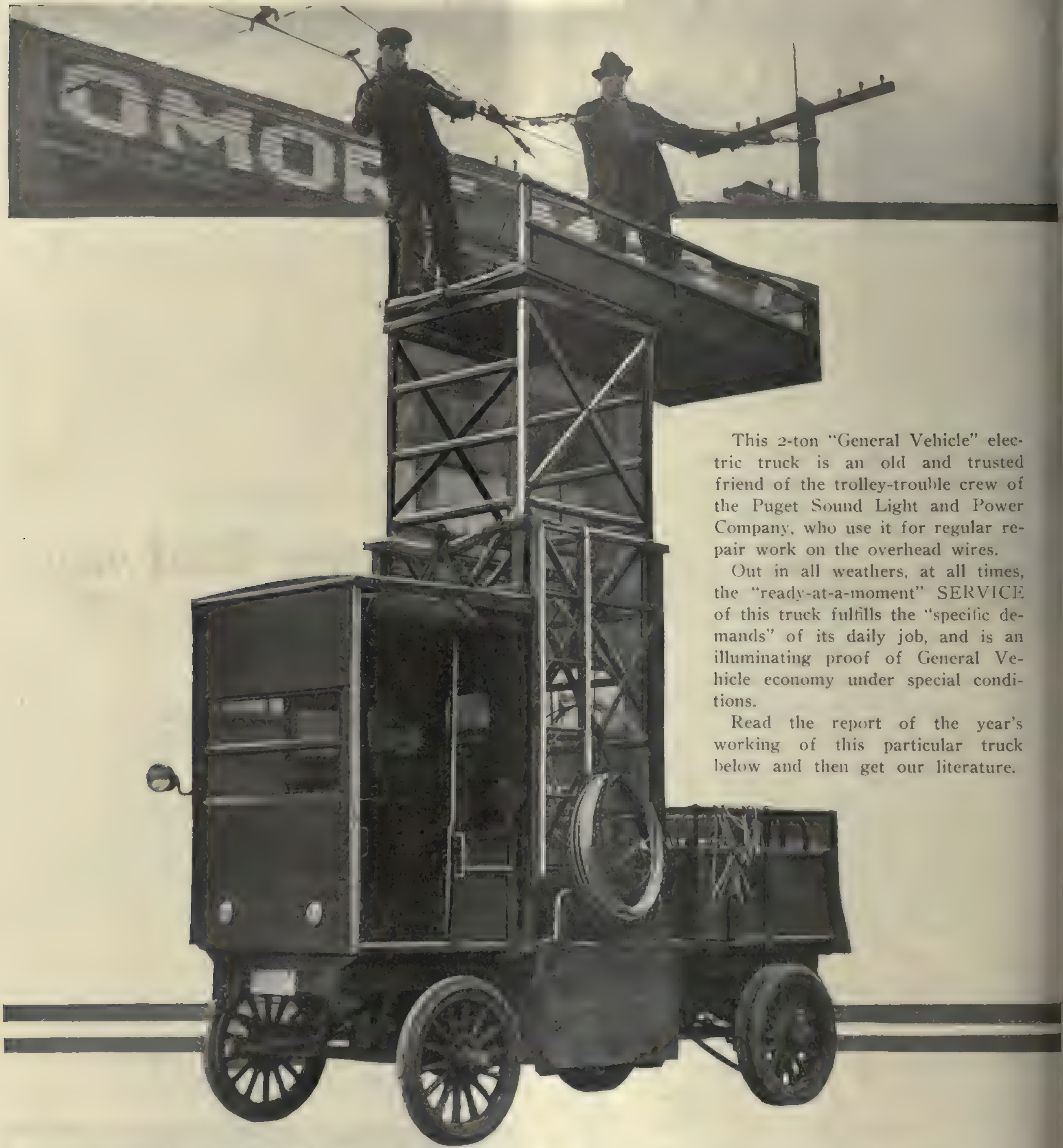
# *"Maintenance tells"*



This 2-ton "General Vehicle" electric truck is an old and trusted friend of the trolley-trouble crew of the Puget Sound Light and Power Company, who use it for regular repair work on the overhead wires.

Out in all weathers, at all times, the "ready-at-a-moment" SERVICE of this truck fulfills the "specific demands" of its daily job, and is an illuminating proof of General Vehicle economy under special conditions.

Read the report of the year's working of this particular truck below and then get our literature.

COST DATA OF GENERAL VEHICLE CO.'S ELECTRIC TRUCK ON PUGET SOUND TRACTION LIGHT & POWER COMPANY

| Service | Capacity of Truck | Miles Made for Year | Total Cost per Mile Cents | Cost per Mile for Power Cents | Miles per Kw.-Hr. | Cost per Mile per Driver Cents |
|---|---|---|---|---|---|---|
| Tower Wagon... | 2 tons | 2332 | 27.0 | 3.15 | 0.79 | 18.5 |

Why not let us demonstrate the economy of these figures? Catalog J-82 on request.

## GENERAL VEHICLE COMPANY, INC.

General Office and Factory
LONG ISLAND CITY, NEW YORK
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# DAVIS STEEL WHEELS

The East St. Louis & Suburban Railway has equipped city and suburban cars with Davis One-Wear Manganese-Tread Steel Wheels.

Their saving in weight—their safety—their economy in operation—the elimination of expensive turnings of treads and flanges, is resulting in the recognizance of the Davis Steel Wheel as the standard for not only high-speed heavy suburban service but also as

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Labor shortage must be met by using equipment of higher efficiency.

V-K Trolley Equipment requires no inspection or lubricating.

It furnishes maximum conductivity, gives exceptional mileage and reduces wear on overhead.

Saves labor all along the line.

Specify V-K, and standardize.

*Send for illustrated catalog.*

**More-Jones Brass & Metal Co., St. Louis, U. S. A.**

## The Motorman Knows That

# The Rico Coasting Recorder

## hows His Increased Coasting Time if He Reduces Brakes-on Time

Every motorman knows that "Brakes-on Time" is one of the four components of his schedule, the other three components being

Power-on Time
Standing Time
Coasting Time

This "Brakes-on Time" is reduced by coasting as much as practicable before the application of the brakes, thus resulting in more coasting—a method

WITHIN THE COMPREHENSION OF
THE MOTORMAN

But practiced by him **permanently** only with the Rico Coasting Recorder because it shows the motorman, in print, the efficient relation between all the components of schedule time and because the true gage of his car-operating efficiency is the proportion of coasting time to schedule time.

## Time is the Essence of Railroading

RAILWAY IMPROVEMENT CO. RICO 61 BROADWAY, NEW YORK

## Sales of Grade M Gearing are still increasing rapidly

Practically all the progressive electric railways in the United States are now using the famous

"More Miles per Dollar Gearing"

## General Electric Company

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# Electric Railway Journal

Published by the McGraw-Hill Publishing Company, Inc.
Consolidation of Street Railway Journal and Electric Railway Review

olume 50 NEW YORK, SATURDAY, JULY 21, 1917 Number 3

## ar Riders Pay for the Service They Desire

TO utility experts the new suburban franchise of the Columbus Railway, Light & Power Company, deribed elsewhere this week, will not seem a remarkable velty. It deserves mention here, however, because it nstitutes another recognition of the fact that a community has the right to receive the service it desires if it equately recompenses private capital for providing ch service. Under the Westerville franchise, the car ders control the service, but a fair return to the comny is automatically insured by a sliding scale of res. Furthermore, the company is protected in an inresting way from political chicanery when the question franchise renewal comes up. If the unexpired term the original or extended franchise should ever become s than fifteen years, the control of service would go o the hands of the company and it might charge any re not in excess of the maximum. The car riders can ert this by offering in time an equally equitable rewal, but they are thus prevented from forcing the mpany into last-minute concessions or operation unr sufferance. The franchise in general seems to be itten in a big way, with better provision for the ture than some electric railway franchises have made.

## I Seems Too Optimistic— Almost Idealistic

WITHOUT doubt the prospective increased governmental regulation of industries under war condins is a matter of interest to utility investors. In our nion, however, the view on this point taken by L. P. mmond, as noted elsewhere this week, is too optistic. It is even inclined toward the idealistic in its ception of existing regulatory practice. Mr. Hamnd's position seems to be, in short, that the utility estor can find solace in the already existing system public control over utilities. These corporations need have such a fear of a sudden and radical readjustnt of earnings as industrial companies might have ich would be for the first time placed under govmental regulation. Quite true, but does this follow? e [the utility investor] is assured that the industry l not be subjected to unwise or unfair regulations and ctices through the inexperience or prejudices of se who undertake its regulation, since the existing ulation is the result of deliberate, intelligent action ed upon the experience of many years and governed a mass of commission and court precedents." Does this presuppose a perfection of regulation which is not yet attained? We believe that many commissioners could well display more knowledge, wisdom and fairness in dealing with utility needs under present conditions. We hope that the day will soon come when Mr. Hammond's statement will be true, but now actualities are what the investor has to consider.

## Line Capacity, Not Individual Car Capacity, the Desideratum

THE one-man car idea is spreading, but this fact only emphasizes the importance that the fundamental principles of one-man car operation should be thoroughly understood. It is not suitable for all lines; still less is it suitable for all cars. In fact, there is great danger that in the flush of enthusiasm over the advantages of the general plan, some companies will attempt to apply it to both lines and cars for which operation with conductors is preferable. A case in point is where an attempt was made in a city of medium size, not long ago, to apply one-man operation to some old 45-ft. double-truck cars, with the result that during the rush hours the schedule speed of these cars was reduced to about 7 m.p.h., yet the management kept the cars in service under the belief that their size was necessary to maintain the capacity of the lines. But line capacity is measured not in seats, but in seat-miles. And if, for example, a new type of car capable of a schedule speed of 14 m.p.h. but with only half the seats could have been introduced, the capacity of the line with the same number of cars would have been the same. The change would also have given a far better service to the public and would, no doubt, have resulted in an increase in revenue more than sufficient to pay interest charges on the new investment and write off the book value of the old cars. The merits of one-man car operation are marked, and they should not be lost by an attempt to apply this practice to conditions and to equipment for which it is not suitable.

## Labor Cost Data on Special Work Reconstruction

ENGINEERS and managers have a justifiable appetite for cost data covering construction, reconstruction and maintenance, because such data furnish reference standards for comparison and assist in making intelligent estimates. In securing articles of a technical character for the ELECTRIC RAILWAY JOURNAL the attempt is made to obtain permission to include the appropriate cost data where such are available. Occasionally it is possible to secure more or less extensive compilations of such data in particular fields. Examples of these are found in the series of charts on overhead construction costs recently published and in a series on special work reconstruction costs begun in this issue. We realize, of course, that conditions differ on different properties so that any data to be of value for comparison must be revised to fit local conditions. They are of great value, however, as a general guide when reasonably specific. More important yet, the publication of cost data furnishes an incentive to study of local unit costs and thus exerts an impelling force in the direction of more rational expenditure. When these local costs are high or low by comparison with the reference standards, there is a natural inclination to search for the causes of the differences. If the latter are found to be justified by conditions, there results an increased confidence in the procedure which has been followed. Otherwise suggestions as to improvement are bound to be forthcoming. The data on special work costs are based upon the experience of the Brooklyn Rapid Transit engineers and represent averages for a very large number of installations. They have been compiled especially for the benefit of the readers of this paper, and we believe that they will be found invaluable for the purposes outlined above.

## The Possibilities for Anti-Friction Bearings

RECENT orders for anti-friction bearings for armatures indicate that the electric railway industry is at last becoming aroused to their value; in fact, one car builder is actually building for stock one-man cars with ball-bearing journals as well as armatures. However, before the bearing makers can go much further with regard to present motors, they must secure more material and moral support. This applies particularly to the substitution of anti-friction bearings on existing designs. So far as new designs are concerned, anti-friction bearings are so readily substituted for the old type that the problem is relatively easy. However, this is not true of present standards. The difficulties are greater and the savings less in converting to the more efficient designs a motor which was made for ordinary bearings. From what we have seen, we doubt the advisability of converting the older types, but would confine the change to the interpole and self-ventilated forms. The application of ball bearings on armatures should be encouraged not only by the railways themselves but also by the motor designers. It is obviously difficult to promote any extended use of armature ball bearings for motors, whether old or new, if the railway has no assurance that it will be able to secure the same features ready-made when it is in the market for additional equipment. No doubt the motor manufacturers will be glad to give their customers the most efficient equipments possible, but it is natural for them to wait until they are assured of a market large enough to reward their departures from existing standards. In plain English, it is up to the railways themselves to break away from the traditional styles of motor-armature bearings. The rising price of fuel is but of many reasons for thinking and acting along lines.

## President Wilson on Fair Profits

HAD President Wilson been retained as spec counsel by the electric railways of the State New York, which are seeking a way to increase th revenues, he could not have stated the aims of clients better than he did in his address of July 12 the business interests of the United States.

The President's text was prices, and in the addr he used these words:

> "A just price must, of course, be paid for everything government buys. By a just price I mean a price wh will sustain the industries concerned in a high state efficiency, provide a living for those who conduct them, able them to pay good wages, *and make possible the exp sions of their enterprises which will from time to time come necessary* as the stupendous undertakings of great war develop. We could not wisely or reasonably less than such prices. They are necessary for the ma tenance and development of industry, and the maintena and development of industry are necessary for the gr task we have in hand."

The President goes on to explain that the prices m include not only costs but profits and surpluses extensions and improvements.

The electric railways of New York State have ask the public service commissions for permission to crease their revenues so that they may do just the v things that the President cites. They want to be a to provide (1) good service, (2) depreciation reser (3) good wages, (4) fair profits.

Records on file with the public service commissio show that now, and for several years past, the inco of the electric railway companies in the State of N York—and the same is true all over the United States has not been great enough to meet these fundamen demands.

Now, note that the emphasis in the President's dress to the business men is on the necessity of go service and continued good service. When he discus justness of prices he makes the measure of justness amount of pay that will perpetuate good service. He in is a lesson for those critics who are thoughtles arguing that because the nickel once produced reven enough for the maintenance of good street railway se ice, it still is enough, in spite of the undisputed loss the nickel's purchasing power and in spite of the f that it takes nowadays at least 150 nickels to pay much of the railroad expenses as 100 nickels would p for five years ago.

Contained within the President's address, too, the ideas that underlie a sound financial policy for t conduct of any business enterprise, electric railwa included. A depreciation reserve should be set asi before dividends are paid.

Contributions to a reserve from current inco to maintain a property in a complete state of efficien are set down by the President as something that a f price includes. In asking that very thing from t public service commissions the carriers have been attacked by the opposition. Yet the necessity of a depreciation reserve is fundamental to good finance, finance that protects the public not only in keeping up service, but in providing for its improvements from time to time. The Supreme Court of the United States has expressed itself plainly (Knoxville case, 1909) on this point, holding that it is not only the right of the company to make such depreciation provision out of current income, but that it is its duty. The Public Service Commission of the Second District of New York in the Niagara Light, Heat & Power case declared that to provide for depreciation by borrowing was wholly unsound and added to its discussion of this subject the observation that "an end to such rottenness of method finally comes in a dilapidated and useless plant."

We speak of these things here only because of the common and unfair criticism leveled at the carriers, who because they point out the necessity of providing for depreciation out of current income have been accused of attempting to "rob" the public. To the voice of the New York State commissions and of the Supreme Court of the United States is now added the voice of the President of the United States to answer this unsound and unfair criticism.

## Long-Distance Transmission in Heavy Electric Traction

PRACTICE on the Chicago, Milwaukee & St. Paul with regard to power transmission directs attention o the rather remarkable manner in which the limitaions of load factor—that bane of electric operation with thin traffic—are being nullified by extension of intervals between power stations. On the St. Paul's most recent project, that of the electrification between Othello and Tacoma, power is to be furnished from a network of high-tension lines at the western end, while a 100,000-volt line from Long Lake on the Spokane River extends across country for about 100 miles before reaching the eastern end near Othello. From his point the railway's transmission line along the right-of-way supplies substations for practically 150 miles further until the power network west of the Cascade Mountains is reached.

Much the same thing is in evidence at the western nd of the company's original 440-mile electrification. The eastern part of this section of the railway approximates the form of a great circular arc which begins just west of the main range of the Rockies and swings rst southeast and then northeast across the Big Belt range out onto the plains of western Montana. Approximately at the center from which this arc is struck with a 90-mile radius are the Great Falls developments. These form the main source of power for the eastern end of the electrification, although they, together with a network of lines from smaller stations, also supply industrial loads in the cities of Butte and Anaconda, respectively 130 miles and 160 miles away. At the western end of this electric zone in Idaho the factor of industrial loads is materially less, and dependence for continuity of supply is placed upon a single hydroelectric station at Thompson's Falls near the extreme western end of the division. In consequence, a short circuit on the railway's right-of-way transmission line near its western end would mean that distribution must be effected all the way from Great Falls to the Idaho line. This maximum transmission distance, similarly to the case of the electrification now in progress, is roughly 250 miles.

No doubt the satisfactory record of the existing installation, notwithstanding the length of line involved, has been due in part to the excellent working conditions existing throughout the Rocky Mountain region, whose extreme dryness is reported even to permit the occasional use of impregnated wood for high-tension insulating purposes. Yet the possibility of 250-mile intervals between power stations has thus at least been made very definite.

What this means to heavy electric traction may be exemplified by assuming, for the sake of illustration, a level road with a 250-mile spacing for the points of power supply. Neglecting passenger service, it may be said that each freight train will require about eighteen hours to pass through the zone served by a power station, and if only two trains per day are operated in each direction the demand on the station, assuming reasonably even train spacing, cannot be less than the load imposed by two trains nor more than that imposed by four. Neglecting starts and waits, this would give in theory a load factor of 75 per cent. If four trains were operated each way daily, the minimum number of trains at one time in a power station zone would be six and the maximum eight, giving in theory a load factor of 87 per cent.

If, now, the length of zone should have been only half that assumed above, or 125 miles, the minimum number of trains served by a power station would be zero, in case two trains each way were operated daily and the spacing each way was therefore twelve hours. The maximum load would be that of two trains, and it is conceivable that this load might last only nine hours, or the time required for one train to pass through the zone, in case the trains met midway. The theoretical load factor would then be only 37 per cent, as opposed to 75 per cent with the longer zone, while if four trains each way per day were operated the figure would be 75 per cent, as opposed to 87 per cent with a power station spacing of 250 miles.

Of course, these figures for load factors are impossible of attainment in practice, because in the first place the heavy drafts of energy for starting trains have been neglected, and in the second place no time has been allowed for trains to stop en route. In addition, daily load factors only have been considered, although seasonal variations in traffic as great as 50 per cent are not uncommon. However, when relative values of the figures are considered there is clearly shown the vital necessity for keeping intervals between power stations at a maximum, especially when traffic is thin.

SUBSTATION AND TRANSMISSION-LINE EQUIPMENT TYPICAL OF NEW INSTALLATION

# Equipment for St. Paul's New Electrified Division

### Details of Power Supply, Substation Location and Capacity, and Line Construction for 21 Route-Miles of Electrified Track as Planned for the Seattle-Othello Division of the Chicago, Milwaukee & St. Paul Railway

As recently announced in the Electric Railway Journal, the Chicago, Milwaukee & St. Paul Railway has undertaken the electrification of a new division at the western end of its transcontinental line. The new work comprises 98.7 route-miles between Othello and Cle Elum, 89.9 route-miles between Cle Elum and Seattle, and 28.3 route-miles between Black River Junction (about 10 miles south of Seattle) and Tacoma.

The total route mileage of 216.9 as given above consists mainly of single track, and the figures do not include any track mileage for yards and sidings. Because of the greater efficiency of yard and siding tracks when electrical operation is in force, the railway company has not yet decided how much of this class of trackage should be electrified. At present, therefore, only route mileages can be given.

The coming electrification of 216.9 miles, plus the 437.6 miles at present electrified between Harlowton and Avery, makes an imposing total of 654.5 route-miles electrically operated by the St. Paul. This is not only the longest electric route in the world, but will be also the longest in single-track mileage, undoubtedly, since the original electrification has 149.4 miles of yard and siding track alone and the electrified trackage in the Seattle and Tacoma yards may bring the grand total close to 1000 miles.

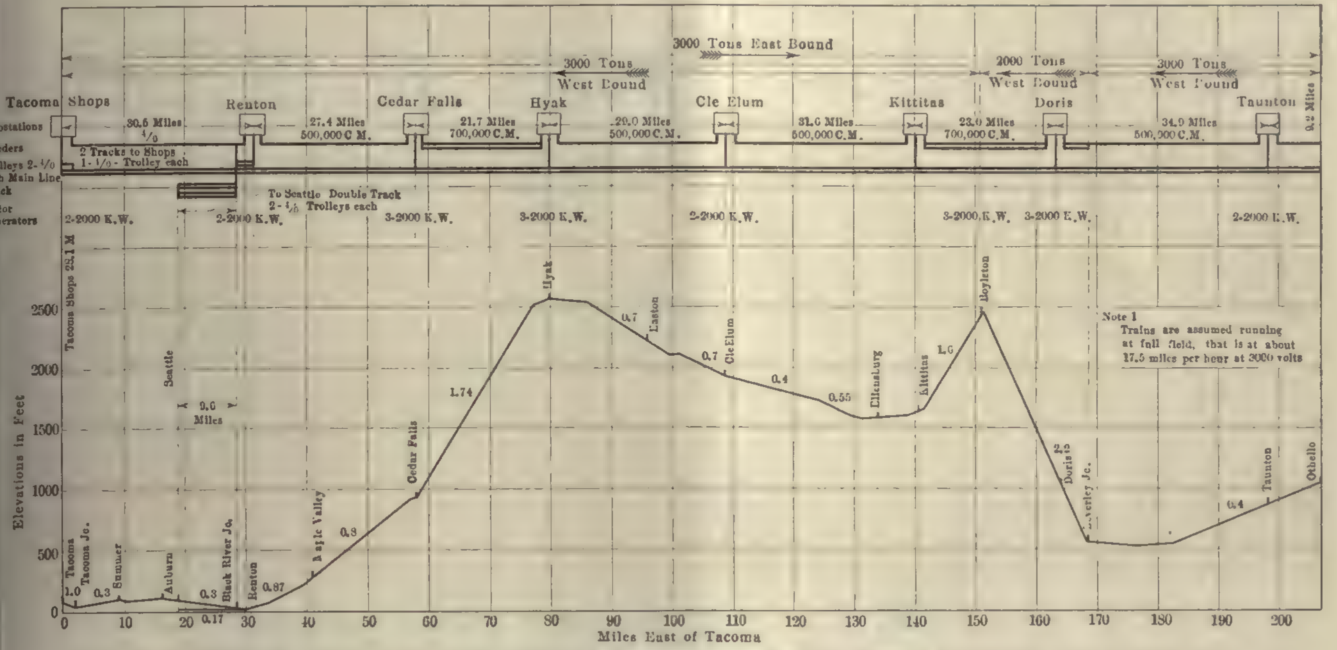
About half of the coming electrification covers heavy mountain grades, including a number of tunnels. The physical characteristics of the new electrically-operated division will, therefore, closely approximate those obtaining on the four electrically-operated divisions in Montana and Idaho.

Arrangements have been made with the Inter-mou tain Power Company to supply power required for th new electrification from Othello to Seattle and Tacoma This power will be generated principally in the Wash ington Water Power Company's plant on the Spokar River, some thirty miles northwest of the city of Sp kane, and at the Snoqualmie and other plants belongin to the Stone & Webster system of western Washingto

The railway company's own transmission line alon the right-of-way will be 100,000 volts, 60-cycles, thre phase, built to about the same standards as its prese lines in Montana and Idaho. The transmission wir will be No. 00, six-strand copper with hemp core, an the aerial ground wire and individual pole grounds c 3/8-in., seven-strand, Siemens-Martin galvanized wir This transmission system will extend from Taunto near Othello, to Cedar Falls, a distance of 140 mile This will serve the eastern end of the new electrific tion. The extreme western end, or the section lyin west of Cedar Falls, will have its substations tied i with a network of hydroelectric lines operated by th companies supplying the energy to the railway.

## Substations, Feeders and Bonds

Substation locations are as tabulated below. The ca pacities that are given correspond to the known abilit of motor-generators of like rating on the Harlowto Avery electrification to handle certain loads. All su station and feeder capacities are based on a trailin train load of 3000 tons eastbound and westbound, ex cept for an 18-mile westbound grade of 2.2 per cen just west of the Columbia River, where the train load i reduced to 2000 tons, this ruling westbound grade ex



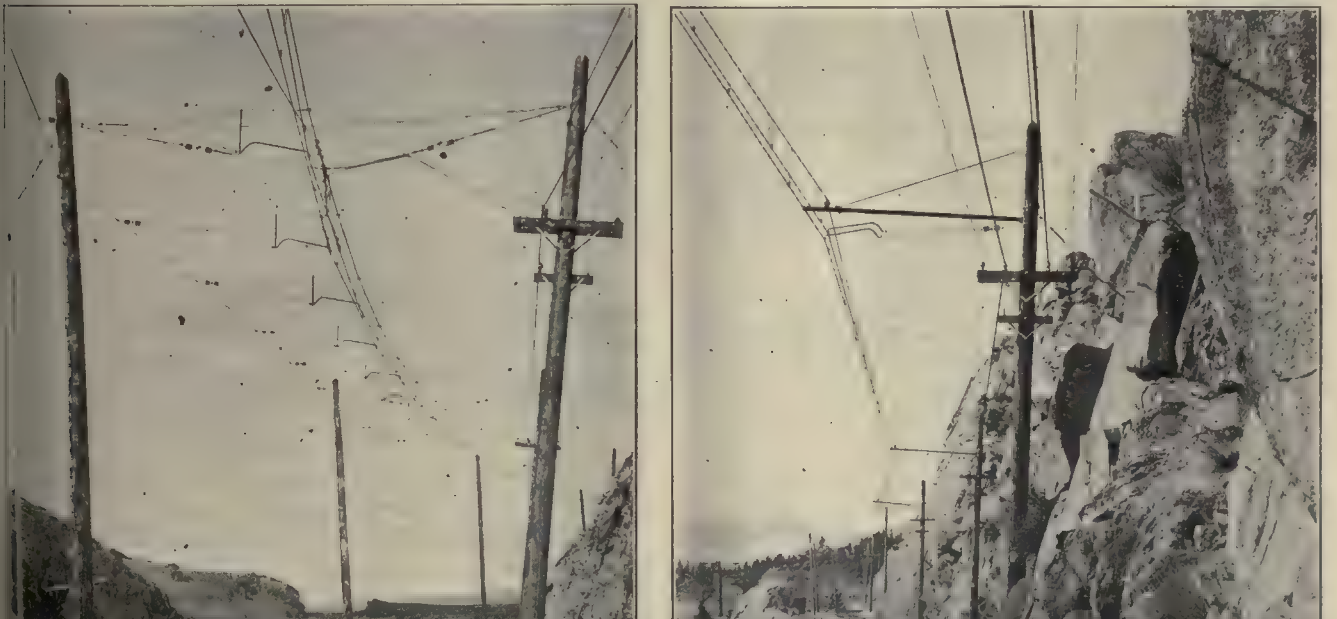
ST. PAUL EQUIPMENT—DIAGRAM SHOWING PROFILE OF SEATTLE-OTHELLO DIVISION TOGETHER WITH SUBSTATION LOCATIONS AND FEEDER CAPACITIES

ending between the stations of Beverly Junction and oylston on the eastern slope of the abrupt divide beween the Columbia and Yakima Rivers. The ruling rade eastbound is 1.74 per cent, and it extends for 20 iles east of Cedar Falls to the summit of the Cascade ountains.

The order and capacity of substations beginning at e east end are given in the following table:

| Substations | Motor-Generators |
|---|---|
| Taunton, 9.2 miles from Othello | Two 2000-kw. |
| Doris, 34.9 miles from Taunton | Three 2000-kw. |
| Kittitas, 23 miles from Doris | Three 2000-kw. |
| Cle Elum, 31.6 miles from Kittipas | Two 2000-kw. |
| Hyak, 29.0 miles from Cle Elum | Three 2000-kw. |
| Cedar Falls, 21.7 miles from Hyak | Three 2000-kw. |
| Renton, 27.4 miles from Cedar Falls | Three 2000-kw. |
| Tacoma, 30.5 miles from Renton | Two 2000-kw. |

The Renton station serves the 10-mile, double-track ne that extends from Black River Junction west to eattle. There is a distance of 2.4 miles between Ren- n and Black River Junction, and this is included in the section listed in the run to the Tacoma substation. The foregoing substation ratings are based upon 150 per cent load for the motor-generator sets for a period of two hours, and 300 per cent load for a period of five minutes. All substation buildings will be of brick,

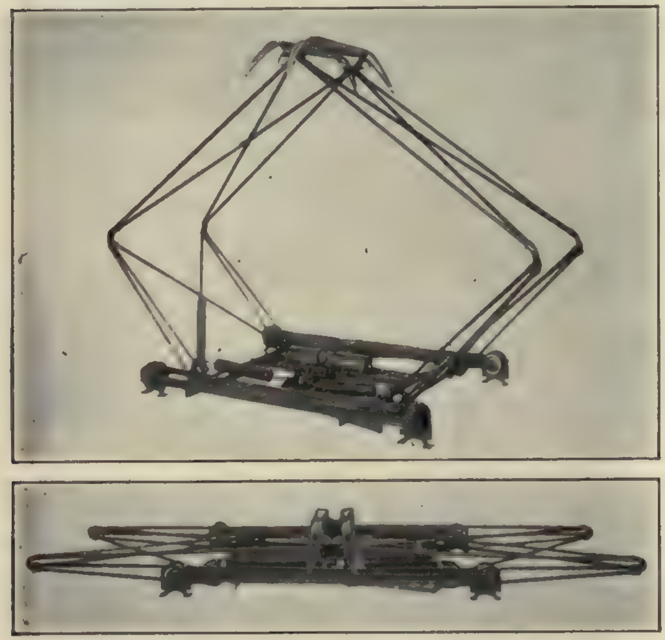


S PAUL EQUIPMENT—TYPICAL ARRANGEMENT OF OVERHEAD CONTACT SYSTEM ON SHARP CURVE AND ON MODERATE CURVE with concrete foundations. At Hyak the machines will be set considerably above the track level to avoid the extraordinarily deep snows that are common in the locality.

The initial feeder capacities in copper are as shown in the following table:

| | |
|---|---|
| Taunton-Beverly Junction | One 500,000 circ. mil |
| Beverly Junction-Doris | Two 500,000 circ. mil |
| Doris-Kittitas | Two 700,000 circ. mil |
| Kittipas-Cle Elum-Hyak | One 500,000 circ. mil |
| Hyak-Cedar Falls | Two 700,000 circ. mil |
| Cedar Falls-Renton | One 500,000 circ. mil |
| Renton-Tacoma | One No. 0000 |

No feeders will be installed on the double-track section between Black River Junction and Seattle, as the four trolley wires will be ample to supply the draft of power without excessive voltage drop.



ST. PAUL EQUIPMENT—VIEWS SHOWING DOUBLE-PAN PANTOGRAPH FOR LOCOMOTIVE IN RAISED AND LOWERED POSITION

Each rail of the main-line track will have one 250,000-circ.mil expansion bond on grades of 1 per cent or less and two 250,000-circ.mil bonds for grades exceeding 1 per cent. These bonds will be tied in with an overhead negative return of No. 0000 bare copper at intervals of approximately 8000 ft. This construction is designed to protect trackmen against large differences in rail potential in case of defective bonds.

### 3000-Volt D.C. Distribution

The d.c. distribution system will be practically a duplicate of the present installation between Harlowton and Avery, as this has proved to be entirely satisfactory during the last year's experience with it. Cedar poles will be standard except for a limited number of steel bridges over multiple track sections and at terminals. Over the Columbia River Bridge the wooden pole construction will be replaced with a combination transmission and trolley wire structure. There will be also some center pole construction and possibly steel supports on curves over the double-track line between Seattle and Black River Junction, these tracks being owned by the Oregon-Washington Railway & Navigation Company and Pacific Coast Railway Company and leased for use by the Chicago, Milwaukee & St. Paul Railway Company's trains.

Throughout, the present catenary standards will be followed exactly. The messenger cable will be of ½-in., seven-strand, galvanized Siemens-Martin steel, with hangers of ¼-in. galvanized steel rods. As the double trolley wire has proved so successful in giving a flexible non-arcing contact, it will be used in the new construction in all cases except at sidings, where only one wire will be suspended from the catenary. The two trolley wires on the main-line tracks will be of No. 0000 copper, clipped to the closed loop hangers every 15 ft. in staggered relation, so that provision is really made for supports at intervals of 7½ ft. The hangers will vary in length from 8 in. to 27 in. Ten-inch air breaks and disconnecting switches will be installed at each side of every passing track.

### Locomotives

It will be recalled that the present St. Paul electric locomotives used for passenger service are really standard freight locomotives that have been provided with passenger gearing. The manufacturers have now been asked to bid on designs specifically intended for passenger service. This passenger type will then be made standard for such service, while the present machines will be used only for freight service. No change is contemplated in the pantograph collectors.

## Four Engineering Societies Form National Council

By co-operation of the four national societies of civil, mining, mechanical and electrical engineers, respectively, a representative body has been formed under the auspices of the United Engineering Society for the purpose of speaking authoritatively for all member societies on all public questions of a common interest or concern to engineers. At the organization meeting, held on June 27 in New York City, a committee was appointed to consider the best means of utilizing the inventive ability of members of the founder societies for the benefit of the government in the prosecution of the war, and the government bureaus have been informed of the desire of the council to be of assistance.

The council is composed of twenty-four members, five from each of the four founder societies and four from the United Engineering Society. The officers are I. N Hollis, Worcester, Mass., president; H. W. Buck, New York, and George F. Swain, Cambridge, Mass, vice-presidents and Calvert Townley, New York,. secretary.

## Employees' Club in Buffalo

The International Railway, Buffalo, N. Y., is organizing a club for all of its employees. At a recent meeting in rooms which are being fitted up on the second floor of the package express terminal, several hundred platform employees, clerks, carhouse men and others attended. The heads of all the departments were present and the spirit of co-operation shown indicated tha the club will be a success. The club is being formed so as to bring the various employees of the company into closer co-operation.

# New Pacific Electric Repair Shops

## lans Are Nearing Completion for a Splendid Plant for the Maintenance and Building of Electric Passenger Cars and Freight Cars at Torrance, the Coming "Iron City" of Southern California

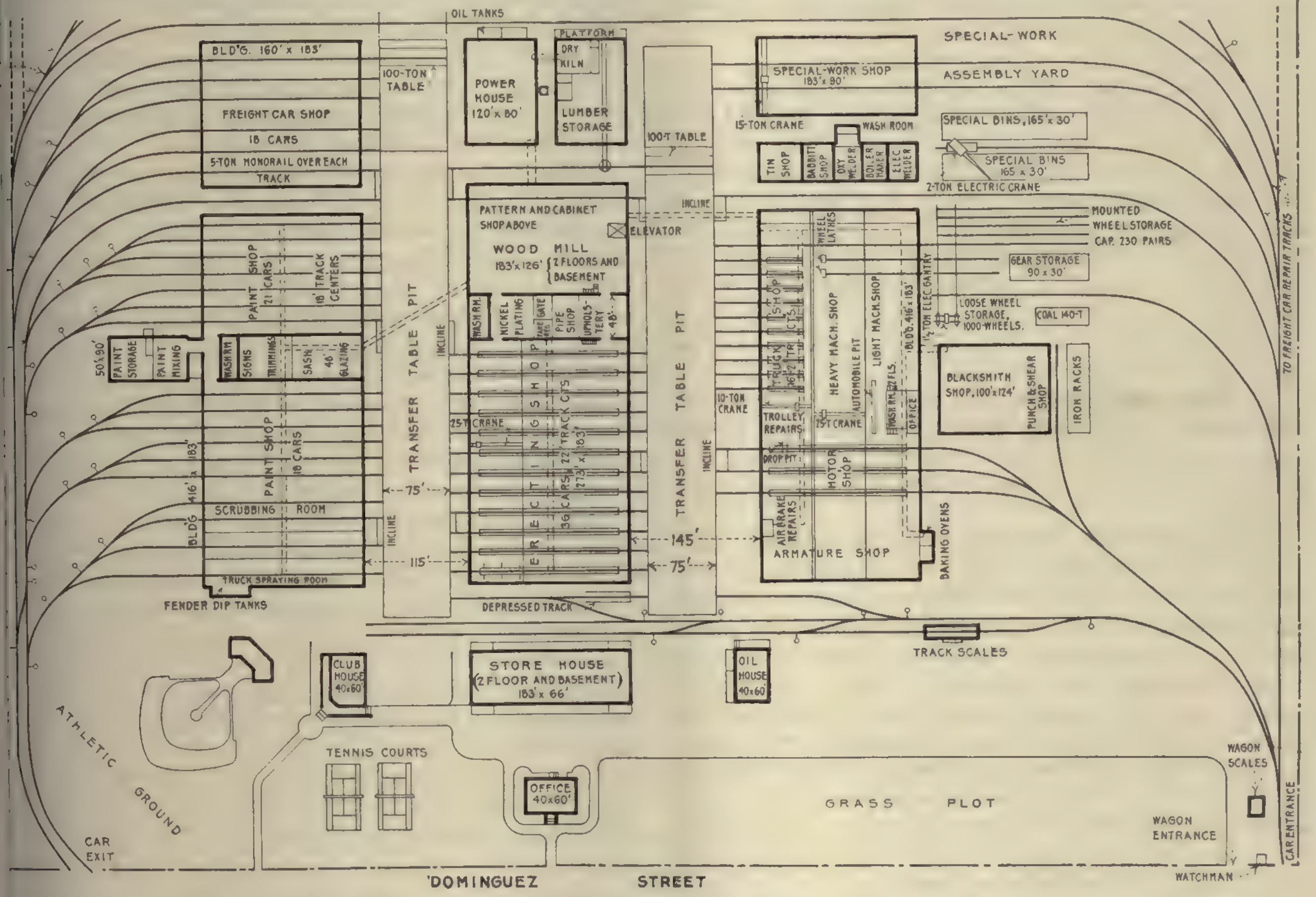
ABOUT 20 miles south of Los Angeles, on the San Pedro line of the Pacific Electric Railway, lies the three-year-old town of Torrance, which is apidly becoming the industrial city of southern California. Because of its proximity to San Pedro (the arbor of Los Angeles) and the availability of cheap nd, many large companies have left cramped quarters Los Angeles and have built at this point, and the acific Electric Railway is preparing to follow suit.

The new Pacific Electric shops are to be located on plot of 125 acres, which will meet all present needs d allow for 100 per cent future expansion, besides rmitting ample storage for heavy freight service. is of interest in this connection to note that the removal of the present Los Angeles shops of the railway company makes way for the warehouse system of the Los Angeles Union Terminal Company. This change indicates that the Pacific Electric Railway is more than keeping pace with the rapid growth of the city of Los Angeles by helping to insure the city's progress along ical and economical lines.

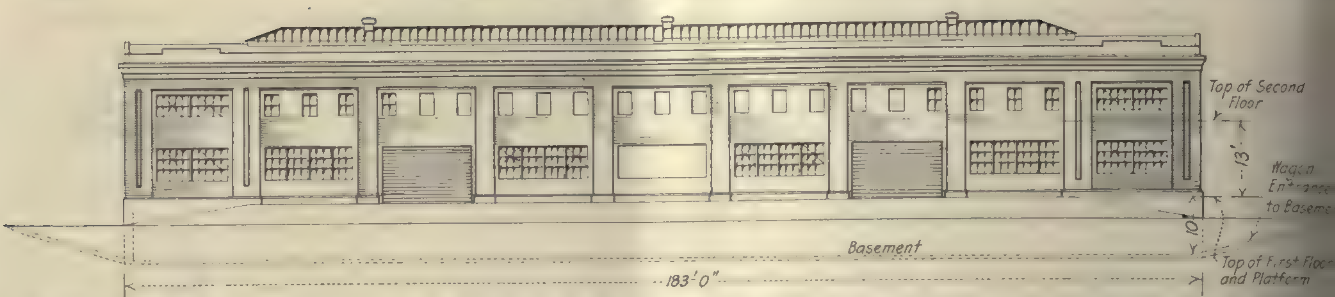
The new shops are to have about 100 per cent more capacity than is now required for the company's equipment. Only heavy overhauling and new work will be regularly undertaken. All light repairs are expected to be handled in the various division carhouses, and the present plan is to run equipment for eighteen months or more between general overhaulings. Owing to this plan there are many unique features in the general layout of buildings.

The accompanying general layout, shown below, is the result of several months' careful study directed toward exactly fitting the needs of this location and the Pacific Electric System. For example, it has been found that southwest trade winds prevail for 90 per cent of the time, and in consequence the paint shop is located at the southwest corner of the yard where dust and soot from the shops will not interfere with painting and finishing operations.

In general the buildings have been laid out to require as few reverse movements and as little handling of material as possible. An outline of the routing plan may be obtained by referring to the plan. A car needing complete overhauling will be run into the east bay of the motor shop shown at the right. At this point connections between the trucks and the car body will be loosened, and parts needing repairs in this building, such as trolleys, controllers, air-brake equipment, etc.,



PACIFIC ELECTRIC SHOPS—GENERAL LAYOUT, SHOWING ARRANGEMENT OF PERMANENT BUILDINGS



PACIFIC ELECTRIC SHOPS—ELEVATION OF STOREHOUSE, SHOWING ARCHITECTURAL FEATURES TYPICAL OF THE SHOP BUILDING

will be removed. The car then will proceed to the center bay, where the 25-ton electric traveling crane will lift the body, and the trucks will be rolled into the west bay, dummy trucks being placed under the body. The motors and their casings will be removed from the trucks by the 10-ton electric traveling crane and taken to the cleaning room in the armature shop, where they will be lowered through a trapdoor in the roof. The trucks will then proceed to the truck shop via either the transfer table or the 10-ton crane. The car body will be hauled by the shop locomotive via the 100-ton, 75-ft. transfer table into the erecting shop.

Arriving in the east bay of the erecting shop, the car body will be stripped of upholstery, gates, fare registers and all other parts in need of repair or replacement. These parts enter the departments assigned to them through doors in the fire walls and the car body will move toward the west bay to be repaired and reassembled. The repaired trucks will be hauled by the shop locomotive via the west transfer table to the west bay of the erecting shop. The car body, which is in this shop, will be raised by the 25-ton electric traveling crane and the trucks rolled under it.

The completely repaired car next enters the scrubbing room of the paint shop under its own power, where it will be thoroughly cleaned. The trucks will be sprayed with a waterproof paint in the truck spraying room.

The car then will proceed to the paint shop, where it will be completely painted and varnished, the new paint being dried by steam heat radiating from shallow pits underneath the car. The fenders and the parts which have been dipped will then be replaced and the car will be ready for service.

The wood mill, which is two stories high, will be served by a 12-ft. x 19-ft. operatorless electric freight elevator with micro-leveling devices. Shavings and sawdust waste will go through an exhaust duct to the boiler in the power house near by.

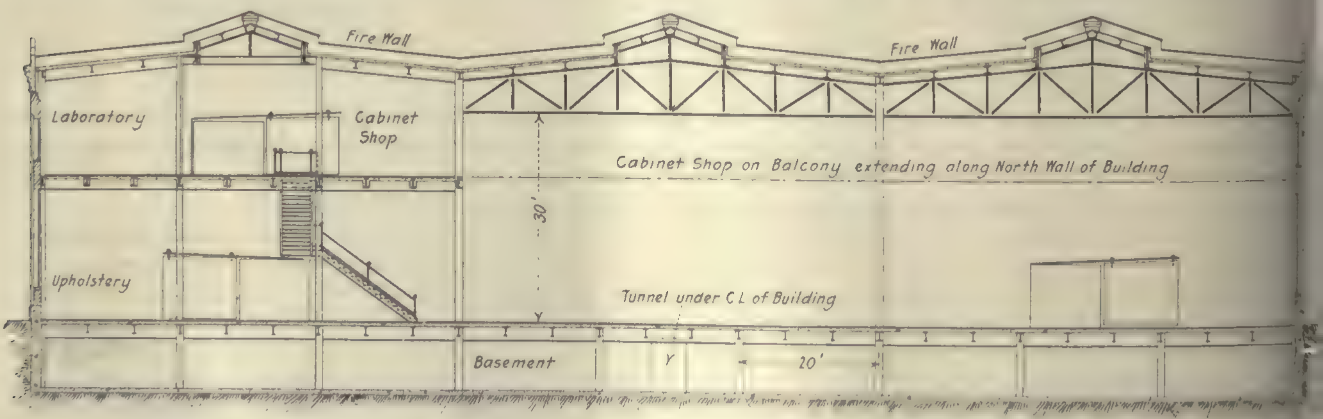
A substation will be located in the power house t care for local car shop and freight car movements Owing to the climate, heat will be required only t accelerate the paint shop process.

Other interesting features of the shop layout ar the basements under the wood mill, truck shop an machine shops for the shafting and the driving belts thus eliminating much confusion and danger. Pip ducts for conveying water, air, etc., are also installe below the floors. There are also provided a depresse track for unloading new cars or mounted wheels ont the transfer table, a steel-car straightener in the erecting shop; a completely-equipped special-work shop, clubhouse and athletic grounds for employees, and a automobile pit in the machine shop.

Extensive facilities for the manufacture as well as th repair of cars are to be provided to the north of th shop buildings shown on the layout. Plans for the immediate future include the erection of a temporary shop 220 ft. x 72 ft. for the purpose of constructing standar freight cars. This construction is to be of temporary rather than permanent character because of the fact tha the Pacific Electric Railway expects to commence work at once upon 300 or more box cars of 80,000-lb. capacity Since permanent buildings for car-manufacturing purposes could hardly be completed in less than nine months time, a temporary structure will be used for the present

The principal buildings are to have steel frames, brick walls, reinforced concrete roof, steel sash and creosoted wood block floor. Large window openings will be provided in the side walls, which, together with three continuous runs of skylight 15 ft. wide in the three main buildings, will give a maximum of daylight.

Although it is planned to make the greatest possible use of machine tools and other equipment now at other shops, the cost of the Torrance Plant, including new cranes, transfer tables and other transport devices, wil be about $1,200,000, making it one of the most complete electric car repair shops in this country.


Fire Wall
Fire Wall
Laboratory
Cabinet Shop
Cabinet Shop on Balcony extending along North Wall of Building
30'
Upholstery
Tunnel under C L of Building
Basement
20'

PACIFIC ELECTRIC SHOPS—CROSS-SECTION OF WOOD MILL, LOOKING SOUTH TOWARD FIRE WALL

ROCK ISLAND SHOPS—TRUCK SHOP EQUIPPED WITH MONO-RAIL TRAVELING HOISTS

# Tri-City Railway's New Shop

## A Combined Shop and Carhouse with Exceptionally Complete Equipment Has Been Built by This Company at Rock Island, Ill., Particular Attention Being Given to Minimizing Fire Risk by the Use of Reinforced Concrete Construction and Frequent Fire Walls

A NEW carhouse and shop building has recently been built by the Tri-City Railway Company to replace a brick and steel-truss structure that was destroyed by fire four years ago. The new building was constructed as two separate units, the first consisting of the four carhouse bays, which were erected on the site of the fire shortly after it occurred. This work was begun in June, 1913, and was completed for car storage and temporary accommodation of some shop equipment by December of the same year. Construction of the second unit was postponed for financial reasons until August, 1916, and this was completed in its details this spring.

All of the design and engineering supervision of the new structure was handled by the company forces, as were also the track work, much of the rock excavation, and the clearing away of the fire débris. The building construction was contracted to a local firm. While the second unit, which replaced an old wooden carhouse, was being built the superintendent, receiver and trainmen were housed temporarily in an old car set out in one of the unheated bays previously constructed, and much of the machinery and stock was placed in an adjoining lot under a 40-ft. x 80-ft. tent.

The new building occupies an old quarry site and, at the rear, extends close to a high bluff. Foundation difficulties were experienced because of the greatly varying depth of a very hard limestone and on account of a large brick sewer that diagonally crosses the lot near the surface. Construction throughout consists of reinforced concrete columns and beams and roof slabs with tar and gravel topping. Partitions are made of paving block laid in half-cement mortar, and metal sash and skylights, Kinnear doors and a front of dark brown brick with terra-cotta trim have been installed.

The entire building of eight bays has a storage capacity for sixty-three cars and a shop capacity for sixteen cars. Normally thirty-five cars operate from this carhouse, with an ordinary maximum of forty-five during peak hours.

There is installed a heating system that consists principally of three-column and four-column radiators from 32 in. to 45 in. high, depending on the location, together with pipe coils hung on the walls. Returns are carried through a concrete trench to an automatic pump in the long inspection pit shown in the plan drawing of the machine shop. This trench is covered by a 2-in. reinforced-concrete slab, made in sections, which can be lifted out if required.

For lighting there is a system controlled from a central switchboard in the carpenter shop near the receiver's office. Additional switchboards control the lights in each shop, and there are individual or group switches in the office portion of the building. Base outlets are provided in the pits, also in the columns of the paint and carpenter shop, these being intended for attaching lights with long cords. In general the lighting is provided by 100-watt type "C" Mazda lamps, and all of the lamps in the shops are provided with 16-in. porcelain reflectors.

Four tracks run through the carpenter shop. One of these goes outside the rear of the carhouse and alongside the wooden shed for lumber storage. Including the wood mill, the size of the carpenter shop is approximately 100 ft. x 100 ft. All of the wood-working machines are run by individual motors, and a cyclone blower system carries the sawdust and shavings to a collector over the boiler room, in which a vault is pro-

ROCK ISLAND SHOPS—CARPENTER SHOP AND WOOD MILL WITH MOTOR-DRIVEN TOOLS

vided for shaving storage. The glue room is provided with a lathe with 16-in. swing, 8-ft. centers, and glue pots which are heated by gas. A temperature of 80 deg. Fahr. is provided for this room.

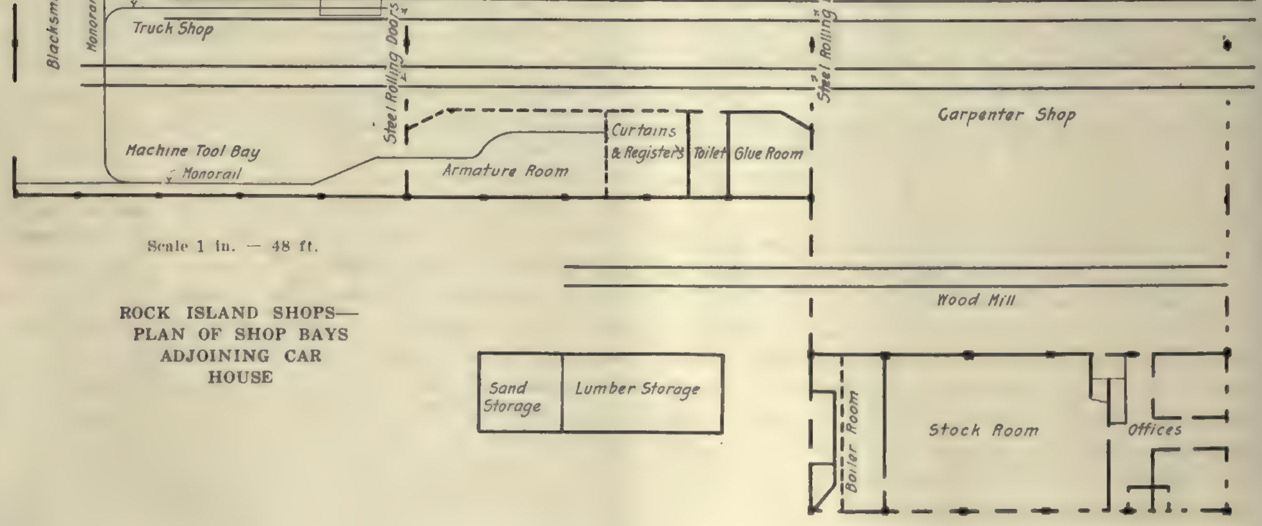
The paint shop is about 100 ft. x 54 ft., with the paint-mixing and sash-and-door rooms at one side. These rooms, as well as the armature room and the curtain and register room, are separated from the paint shop by iron grill partitions.

The machine shop is about 95 ft. x 75 ft., and the bay adjoining this shop is provided with a long pit under three tracks, which is utilized for car inspection.

A wheel press and wheel borer are installed at the rear end of this bay, and there is also a transfer table connecting the three tracks. An overhead carrier system is provided for connecting the machine shop pits and the machine tool bay with the armature room.

To support the trolley wire over the shop tracks a steel insert is provided in the bottom of each concrete beam at the center line of each car track. To this insert is bolted a piece of wood 4 in. x 4 in. x 22 in., this being placed parallel to the track. The carhouse hangers for the trolley are fastened to the outside end of this wooden block.

A wooden lumber storage shed is provided at the rear section of the shops, the size of this being 20 ft. x 40 ft. Adjoining this is the main sand storage, 20 ft. x 20 ft. in dimensions, this giving a capacity for 200 yd.



Scale 1 in. — 48 ft.

ROCK ISLAND SHOPS—PLAN OF SHOP BAYS ADJOINING CAR HOUSE f sand. The sand room, from which the cars are anded daily, is located, together with the salt room, oil oom and dry kiln, between the carpenter shop and the nspection bay. The oil room is provided with five Bowser pumps with underground storage tanks, and lso with a rack on which oil barrels are placed by neans of a chain hoist operating on an I-beam.

Following is a list of the machine tools installed: For he machine shop, three engine lathes, radial drill, two drill presses, shaper, milling machine, bolt cutter, grindstone, dry grinder, tool grinder, drill grinder, power hack saw; for the blacksmith shop, two forges, furnace, air hammer; for the wheel shop, wheel press, wheel borer, dry grinder; for the wood mill, two jointers, planer, rip saw, cut-off saw, shaper, band saw, boring machine, sticker, sander, tenoner, swing saw, mortiser, grindstone, emery wheel.

Two floors are provided for part of the building. The two-story portion is used, on the first floor, for receiver's and superintendent's offices, stock room and boiler room, and, on the second floor, for trainmen's quarters. The stock room is provided throughout with metal shelving, the size of this room being 53 ft. x 37 ft.

For the shower baths and washroom in the trainmen's quarters on the second floor a Ruud automatic water heater is provided in the boiler room, a reserve capacity being provided near the heater. The trainmen's quarters have a poolroom containing two standard pool tables, with chairs and fixtures finished in dark brown. The floor is covered with linoleum. The trainmen's locker room is provided with 129 lockers, and there is a meeting room at the rear of the second floor which has a platform at one side, base outlets being installed for attaching moving-picture apparatus.

Virtually everything possible was done to make this carhouse and shop a low fire risk. The brick and concrete walls, with concrete columns, beams, roof slabs and skylight curb, provide as nearly a fireproof structure as possible. All bays are separated from each other by 13-in. walls, and openings are protected by double fire doors, while the partition wall between the paint and machine shops is provided with double rolling shutters. Fire extinguishers, sand pails, fire hydrants and other protective devices have also been provided to minimize the fire risk and secure advantageous insurance rates, and an A. D. T. system has been installed, while an additional city fire-alarm box near the property is being considered.

Intercommunicating telephones are provided in each shop with a central station in the receiver's office.

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# The Coming Decade in Development of the Electric Street Railway

### E. H. McHenry Visualizes the Immediate Future in the Light of Experience of the Steam Railroads

In discussing some of the present aspects and future prospects of the electric railway business with one of the editors of the ELECTRIC RAILWAY JOURNAL recently, E. H. McHenry of the firm of McHenry & Murray, New Haven, Conn., formerly vice-president of the New Haven Railroad, expressed some ideas which may well be pondered carefully by the managers and other operators of electric railways.

Reasoning from the analogous history of the steam railroads, Mr. McHenry expressed the belief that the street and interurban railway is entering upon a decade in which very difficult conditions will be encountered. The ever-increasing demand for improved and additional service cannot be so readily compensated by commensurate increase in fares as in steam railway service by reason of the practical and psychological limits set by the all but universal adoption of the "nickel" as the basic maximum "short-ride" fare. The public will not willingly consent to the establishment of another and higher basic rate, nor yet to the logical alternative of a reduction of the amount of service rendered for such fare. If restricted in the exercise of both alternatives, electric railways can then only find relief by the reduction of operating expenses, for which the opportunities will be relatively slender in the face of increasing charges for fuel, labor and materials, unless secured in the form of exemptions from taxes, paving assessments and other burdens of like character now superposed upon the service requirements. Relief in this form, although reasonable and sound in theory, cannot be expected until the public has been educated by bitter experience into a clearer perception of the relations of the character of the service demanded to the cost of such service and of the inherent unreasonableness of its demand for service of a higher value than that for which it is willing to pay.

A general and bad breakdown in steam service was first necessary before even a glimmering perception of this relation recently began to dawn upon the public, and it is much to be feared that a costly and trying experience of the same kind will be necessary in the lighter and less completely unified electric railway service before this fact will be brought home to the public and the necessary relief afforded.

The steam railroads, it is hoped, are emerging from their dark days, for the public is showing a willingness to bear its share of the burdens which have been laid upon the railroads by economic conditions. It is natural that relief should come to the steam railroads first, because it is clearly evident to the public that the prosperity of the country depends upon having adequate and efficiently operated railroad facilities.

The case of the electric railways is different, in a way, although ultimately they will be granted relief for the same reasons as those effective with the steam railroads. It is, however, less evident to the riding public that it is dependent upon the electric railway. In the cities it is often possible to walk rather than ride, or the irresponsible but convenient jitney may tempt the prospective rider away from the safer and more comfortable trolley car. The private automobile, of course, is a serious competitor of the electric railway, not only in the cities but also outside. Municipal ownership of street railways has been proposed as a remedy for the difficulty of operating them with satisfaction to the public. This, in Mr. McHenry's opinion, would not prove satisfactory or economical. Considering the returns which are made for municipally owned and operated roads here and abroad, it is clear that the public does not receive in the form of profit as much as privately owned railways pay in direct and indirect taxes. This fact also the public will appreciate in time and will so modify the conditions under which the railways are permitted to operate that those who have money invested in these railways may receive a fair return.

## New Home for Lincoln Traction

### Building Just Erected by Lincoln Traction Company Officials Provides Beautiful Offices for Company Business

A BEAUTIFUL white tile concrete and steel ten-story office building has recently been built at a prominent corner on the principal business street of Lincoln, Neb., by the Lincoln Terminal Company, the officers of which are officials of the Lincoln Traction Company. Part of the main floor is given over to salesrooms for the light and power division of the company's business. On the third floor a suite of offices extending across the front of the building is used by the traction company officials. The president's office occupies the central room of this suite, with the superintendent of the lighting division on one side of him and the vice-president and general manager in charge of the railway end of the business on the other side. The general manager's office overlooks the principal car lines in the downtown district, thus making it most convenient from an operating standpoint. The other offices used by the traction company are grouped about this principal suite across the front.

NEW TERMINAL BUILDING AT LINCOLN

The dispatcher's office is located over the main entrance to the building and on the half story off the landing between the first and second floors. The entire front of his office is window glass, which greatly facilitates his control of cars and trainmen. Being only a short distance above the ground, he is able to talk readily with and signal trainmen in front of the building. His office is also within easy access of the trainmen when they have occasion to talk with him personally. A telephone mounted on a post at the curb immediately in front of the dispatcher communicates direct with him.

TRAINMEN'S REPORT ROOM IN THE BASEMENT

The front section of the basement of the terminal building is finely equipped for the use of trainmen. Access to these rooms is gained by a short stairway from the lobby of the building or from an outside stairway at the side of the building. These rooms extend under glass sidewalks on the two sides of the building which give ample day-lighting to the trainmen's quarters. A large billiard and game room is finely furnished and is equipped with four regulation billiard and pool tables, forming a popular and attractive place for the trainmen off duty. Another room is equipped with a long table and chairs for the use of the trainmen in making out reports. A bulletin board extends along one wall, and all notices to trainmen are posted here in frames behind glass. Just off this room is an office for the use of the superintendent of transportation, and this is also well lighted by means of glass in the sidewalk above. Another fairly large room is equipped with steel lockers and steel tables, where the men may eat their lunches. Just off this room is a large lavatory and toilet room, finished in marble and tile and equipped with the most modern type of porcelain fixtures and a marble shower bath. The locker room and toilet room are located right at the foot of the stairway so that they are very conveniently situated for the use of the trainmen when on or off duty.

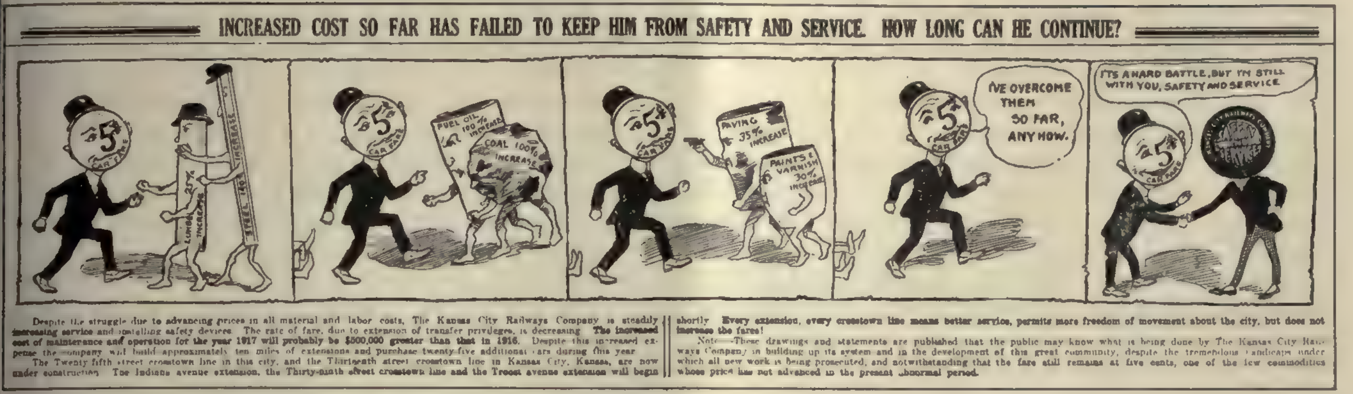
## Why Kansas City People Understand

### The Advertisements from the Daily Papers Reproduced Herewith Show How the Public Is Informed About Railway Problems

PREVIOUS articles in the ELECTRIC RAILWAY JOURNAL have told of the success which the Kansas City (Mo.) Railways is having with its public relations work. The advertisements reproduced herewith from the daily papers simply show some of the more recent publicity work. For example, the daily publication of the causes for street car delays has been one of the most successful features of the company's "let-the-public-know" policy. It shifts the responsibility from the railway and makes the passengers "sore" at the unavoidable track conditions instead of at the company.

Any improvement in the company's service is thought to be a fit subject for advertisement, for otherwise the riders may fail to notice the change for the better. Likewise, the cartoon form of telling of the higher material costs is effective and may serve to place the people in the right frame of mind to appreciate the necessity of an increase in fare.

Recently an unusual newspaper advertisement expressed the company's regret for a serious accident which had happened that day. This was published in the same issue with the story of the accident. The newspapers secured all their information concerning the accident from the publicity manager, E. B. Atchley, who, as is his custom, told the absolute truth. It was one of those cases where no one seemed to be particularly to blame, there being perhaps a combination of carelessness on the part of both parties. The advertisement was used simply to point out the need of greater care on the part of everyone. Neither of the newspapers which ran the story attempted to place the


INCREASED COST SO FAR HAS FAILED TO KEEP HIM FROM SAFETY AND SERVICE. HOW LONG CAN HE CONTINUE?
5¢ CAR FARE
LUMBER 25% INCREASE
STEEL 140% INCREASE
FUEL OIL 100% INCREASE
COAL 100% INCREASE
PAVING 35% INCREASE
PAINTS & VARNISH 30% INCREASE
I'VE OVERCOME THEM SO FAR, ANY HOW.
IT'S A HARD BATTLE, BUT I'M STILL WITH YOU, SAFETY AND SERVICE
KANSAS CITY RAILWAYS COMPANY SAFETY AND SERVICE

Despite the struggle due to advancing prices in all material and labor costs, The Kansas City Railways Company is steadily **increasing service** and installing safety devices. The rate of fare, due to extension of transfer privileges, is decreasing. **The increased cost of maintenance and operation for the year 1917 will probably be $500,000 greater than that in 1916.** Despite this increased expense the company will build approximately ten miles of extensions and purchase twenty-five additional cars during this year.

The Twenty-fifth street crosstown line in this city, and the Thirteenth street crosstown line in Kansas City, Kansas, are now under construction. The Indiana avenue extension, the Thirty-ninth street crosstown line and the Troost avenue extension will begin shortly. **Every extension, every crosstown line means better service, permits more freedom of movement about the city, but does not increase the fares!**

Note.—These drawings and statements are published that the public may know what is being done by The Kansas City Railways Company in building up its system and in the development of this great community, despite the tremendous handicaps under which all new work is being prosecuted, and notwithstanding that the fare still remains at five cents, one of the few commodities whose price has not advanced in the present abnormal period.

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## The Kansas City Railways

Deeply regret the serious and unfortunate accident at Mt. Washington Tuesday forenoon when seven persons were injured.

This company is striving to its utmost to impress carefulness and safety upon each of its employees and asks the public, and particularly the drivers of automobiles, to exercise great care in passing in front of cars at street crossings and elsewhere. None of us can be too careful.

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## Street Car Delays

**Friday Morning, April 27**

At 8:52 a dray wagon stalled on the tracks at Sixth and Delaware delayed Argentine and Observation Park cars 25 minutes.

At 8:58 a wagon stalled at Nineteenth and Oak blocked Jackson Avenue and Holmes Street cars 12 minutes.

At 9.05 an auto backing from the curb collided with a Holmes Street car at Sixteenth and Walnut, blocking traffic 10 minutes.

Track rebuilding on the Independence Avenue line between Indiana and Bales Avenue caused some delay to the new *5-minute schedule* installed today on that line. This interference will be temporary and the improved service will undoubtedly be working admirably in a few days.

Complaints and suggestions always given prompt, courteous attention.

THE KANSAS CITY RAILWAYS.

April 27, 1917.

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## The Kansas City Railways

**We exceedingly regret the delay in service at 8 o'clock yesterday morning. This delay was caused by an ice jam, sand and the extremely low stage of the river.**

**This has necessitated continuous blasting of sand bars opposite our quadruple intake pipes at the power plant, the river front and Grand Avenue.**

**For three hours—from 4 to 7 p. m.—Thursday, December 14, these conditions forced us to lessen the heat in our cars. This is the only time the heat in the cars has been reduced since it was first turned on late in October.**

KANSAS CITY RAILWAYS
1500 Grand Avenue

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## The Track Hog a Menace to Traffic and Safety!

Sometimes you are in a hurry—and wait several minutes for a street car. You grow impatient and wonder **what is the matter**—and condemn the car service. Then two, three, perhaps four cars come along in a bunch—the first two overcrowded. The following headlines from Wednesday's Star furnishes **one reason** why the cars were bunched:

**THE CAR TRACKS SUITED THEM.**

**So Father and Son Were Fined for Delaying Troost Cars.**

Testimony showed traffic was blocked between Forty-seventh Street and Seventeenth! The offenders remarked "that it seemed to be smoother on the car tracks so we struck there." Yes, they admitted the motormen rang the gongs repeatedly but "that didn't bother them any."

So Judge Kearnan fined them! The offenders declared "only the street car company was discommoded" but the court took the viewpoint that **the people who were riding on the delayed cars and those waiting along the line were the ones discommoded!**

Why, the street railway company was the least interest discommoded. It is the passengers—the people who daily go to and from their work on the street cars—who are discommoded by the TRACK HOG.

The Railways Company is doing everything it can to provide service. Cars are operated on fixed schedules. Additional cars are being placed on all lines where there is heavy traffic. Conditions have improved under the recent traffic ordinances. But do not forget that the street railway company is not to blame where city ordinances are violated—not to blame where the TRACK HOG insists on operating. That is for YOU to consider!

THE KANSAS CITY RAILWAYS

Philip J. Kealy

PRESIDENT

Note—This advertisement is published in an endeavor to bring to the attention of the people of Kansas City a thorough understanding of traffic delays. The correction is in the hands of the community, not the company.

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## IMPROVED SERVICE ON FIFTEENTH STREET LINE

To Patrons:—

Effective Monday morning, April 23, improved service will be established on the **Fifteenth Street Line** during the morning and evening rush hour periods. **Two additional cars** will be placed in service on that date and the following schedule will prevail during the two periods:

(CUT OUT AND SAVE.)

| Leaving 15th and Crystal | | Leaving 8th and Walnut | |
|---|---|---|---|
| 6:00 A.M. | 7:19 A.M. | 4:05 P.M. | 5:36 P.M. |
| 6:07 " | 7:23 " | 4:11 " | 5:39 " |
| 6:13 " | 7:28 " | 4:17 " | 5:41 " |
| 6:18 " | 7:30 " | 4:22 " | 5:44 " |
| 6:24 " | 7:34 " | 4:29 " | 5:47 " |
| 6:29 " | 7:38 " | 4:33 " | 5:50 " |
| 6:33 " | 7:45 " | 4:38 " | 5:53 " |
| 6:38 " | 7:48 " | 4:42 " | 5:56 " |
| 6:42 " | 7:53 " | 4:47 " | 5:59 " |
| 6:46 " | 7:58 " | 4:51 " | 6:02 " |
| 6:52 " | 8:04 " | 4:56 " | 6:05 " |
| 6:56 " | 8:11 " | 5:00 " | 6:08 " |
| 7:07 " | 8:18 | 5:05 " | 6:11 " |
| 7:11 " | 8:26 | 5:09 " | 6:14 " |
| 7:14 " | 8:30 " | 5:13 | 6:17 " |
| | | 5:17 " | 6:20 " |
| | | 5:20 " | 6:25 " |
| | | 5:23 " | 6:30 |
| | | 5:26 | 6:40 " |
| | | 5:29 | 6:51 " |
| | | 5:32 " | 7:05 |

It is the policy of The Railways to improve service on any line where the increase in patronage will justify additional service.

It is the desire of this company to satisfy all its patrons at all times.

Complaints and suggestions always given prompt, courteous attention.

THE KANSAS CITY RAILWAYS.

Philip J. Kealy
President.

April 22, 1917

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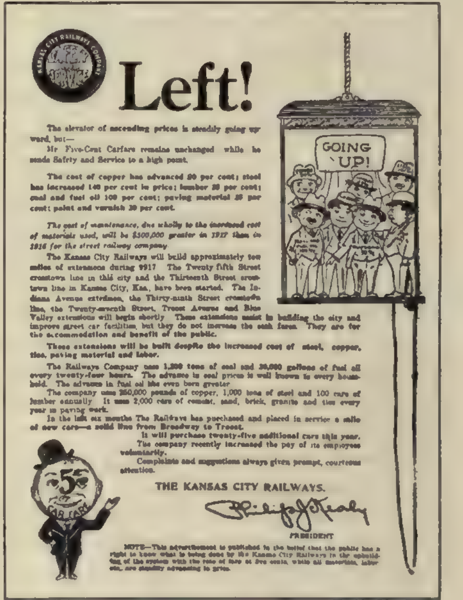
KANSAS CITY RAILWAYS COMPANY SAFETY AND SERVICE
GOING UP!
5¢ CAR FARE

# Left!

The elevator of ascending prices is steadily going upward, but—

Mr. Five-Cent Carfare remains unchanged while he sends Safety and Service to a high point.

The cost of copper has advanced 90 per cent; steel has increased 140 per cent in price; lumber 25 per cent; coal and fuel oil 100 per cent; paving material 35 per cent; paint and varnish 30 per cent.

*The cost of maintenance, due wholly to the increased cost of materials used, will be $500,000 greater in 1917 than in 1916 for the street railway company.*

The Kansas City Railways will build approximately ten miles of extensions during 1917. The Twenty-fifth Street crosstown line in this city and the Thirteenth Street crosstown line in Kansas City, Kas., have been started. The Indiana Avenue extension, the Thirty-ninth Street crosstown line, the Twenty-seventh Street, Troost Avenue and Blue Valley extensions will begin shortly. These extensions assist in building the city and improve street car facilities, but they do not increase the cash fares. They are for the accommodation and benefit of the public.

These extensions will be built despite the increased cost of steel, copper, ties, paving material and labor.

The Railways Company uses 1,200 tons of coal and 30,000 gallons of fuel oil every twenty-four hours. The advance in coal prices is well known to every household. The advance in fuel oil has even been greater.

The company uses 250,000 pounds of copper, 1,000 tons of steel and 100 cars of lumber annually. It uses 2,000 cars of cement, sand, brick, granite and ties every year in paving work.

In the last six months The Railways has purchased and placed in service a mile of new cars—a solid line from Broadway to Troost.

It will purchase twenty-five additional cars this year.

The company recently increased the pay of its employees voluntarily.

Complaints and suggestions always given prompt, courteous attention.

THE KANSAS CITY RAILWAYS.

Philip J. Kealy

PRESIDENT

NOTE—This advertisement is published in the belief that the public has a right to know what is being done by the Kansas City Railways in the upbuilding of the system with the rate of fare at five cents, while all materials, labor, etc., are steadily advancing in price.

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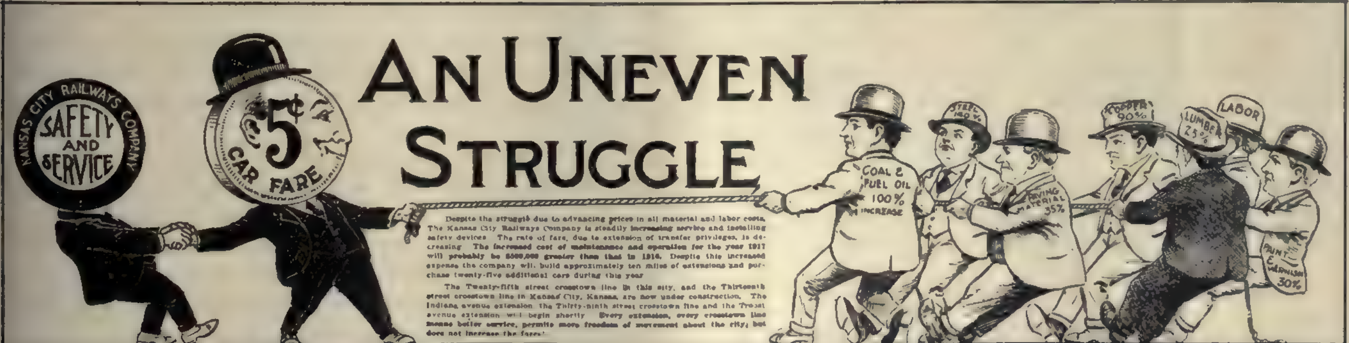


# AN UNEVEN STRUGGLE

Despite the struggle due to advancing prices in all material and labor costs, The Kansas City Railways Company is steadily **increasing service** and installing safety devices. The rate of fare, due to extension of transfer privileges, is decreasing. **The increased cost of maintenance and operation for the year 1917 will probably be $500,000 greater than that in 1916.** Despite this increased expense the company will build approximately ten miles of extensions and purchase twenty-five additional cars during this year.

The Twenty-fifth street crosstown line in this city, and the Thirteenth street crosstown line in Kansas City, Kansas, are now under construction. The Indiana avenue extension, the Thirty-ninth street crosstown line and the Troost avenue extension will begin shortly. **Every extension, every crosstown line means better service, permits more freedom of movement about the city, but does not increase the fares!**

TYPICAL NEWSPAPER ADVERTISEMENTS OF KANSAS CITY RAILWAYS blame on anyone. No one afterward contended that the advertisement was an acknowledgment of the company's responsibility for the accident.

A feature of the company's publicity policy is that the publicity manager never tries to get a story (free advertising) in any of the papers. If the company has anything to say, it buys the space. Then it can say just what it wants to. On the other hand, newspaper reporters are constantly dropping into the publicity manager's office for news, for they have learned they can depend upon him to give them the truth regardless of what the situation may be. If there is a company matter which, for certain good reasons, it is not desired to announce until later, the newspaper men are so informed. They have not yet betrayed this confidence.

## A Franchise for the Car Riders

### Under Columbus Suburban Franchise Car Riders Are to Have What They Demand in the Way of Service, and That Service Is to Be Furnished at Cost

The new franchise recently granted for the Westerville suburban line of the Columbus Railway, Power & Light Company, Columbus, Ohio, is said by the company to be a model for future electric railway franchises in Ohio. Some points of this were mentioned in the Electric Railway Journal of June 23, page 1156, but further details will now be given.

The two principles underlying the franchise are the following: First, the community served has a right to any kind of service it desires and to the control of that service. Second, the individuals receiving that service should pay the cost thereof, such cost to include a fair return on the capital invested.

### Length of Franchise and Control of Service

The original franchise is for twenty-five years. Any time after it takes effect, however, the enabling body, the county commissioners, have the right to renew it for such period, not less than fifteen years or less than the then expired term, as they may be by law authorized. The commissioners through an appointed representative, the street railway commissioner, have the right to control the service, including the fixing and altering of schedules, the changing of service and the establishing of stops. They must not require service to such an extent that enough money will not be produced to make good any loss in the working capital later described.

The commissioners have general control of service, however, only when under the original franchise or any renewal accepted by the company the grant has more than fifteen years to run. When the grant or any renewal has less than fifteen years to run, the company assumes control of the service and may charge during the unexpired term any fare not in excess of the maximum now provided. If the commissioners, however, offer a renewal extending the life more than fifteen years and this contains no substantial changes or additions to the burden of the company, the commissioners retain control if the renewal is refused by the company. Yet it is especially provided that the right to accept such offer of renewal at all times remains with the company.

### Earnings Allowed and Fares to Be Charged

The company is allowed to earn 6 per cent upon its present investment and 8 per cent upon future capital investment. Its present investment was fixed by arbitration at $350,000. For the first ten years the company waives all earnings upon $75,000 of this amount. It adds, however, a cash working capital of $25,000, making a total investment of $300,000 at the beginning of franchise operation.

The franchise provides for a sliding scale of fares. The following schedule has been adopted for ticket fares: (a) Four tickets for 10 cents; (b) five tickets for 15 cents; (c) ten tickets for 35 cents; (d) five tickets for 20 cents; (e) ten tickets for 45 cents; (f) five tickets for 25 cents; (g) ten tickets for 55 cents, and (h) five tickets for 30 cents. The maximum cash fare to be charged is 6 cents for any zone, there being three zones now established for a distance of 10.364 miles. As long as the zone rate of fare upon a ticket basis is 4.5 cents or less, the cash fare is to be 5 cents a zone. When the ticket fare is more than 4.5 cents, the cash fare will be 6 cents a zone. Nothing in the grant precludes the use of commuters' rates with the approval of the county commissioners, but such rates can be established only by the company.

The fare used at the first is that provided in (d), five tickets for 20 cents, or a cash fare of 5 cents. Changes from this or any other rate are to be made upon the following basis: To the working capital, beginning at $25,000, are to be added each month all passenger and freight receipts. From it each month is to be deducted the cost of operation, one-twelfth of the estimated annual taxes and one-twelfth of the annual return upon the investment for that month. When the balance equals or exceeds $35,000, the next lower rate of fare must be put into effect; and when it equals or is less than $15,000, the next higher rate of fare. Any lowering of fares must take place at the order of the county commissioners after any monthly report from the company discloses the condition of the fund to warrant it. Any raising of the fare may be made by the company after its report is filed.

### Improvements, Purchase and Arbitration

Either the company or the county commissioners may propose extensions, betterments or permanent improvements. When proposed by the commissioners, such improvements must be made if the company can procure the necessary money, unless they are held to impair the present or future ability to earn the allowed return. In such a case the company's claims must be arbitrated. Improvements proposed by the company must be approved by the commissioners before the expense is incurred. All approved improvements are, of course, added to the rate basis.

It is agreed that the company will at any time, upon six months' notice in writing by the commissioners, sell to the public its property at 110 per cent of the investment at the date of purchase. This will consist of $350,000, plus the working capital of $25,000 and all capital investments made after the date of the present franchise.

Whenever differences arise between the commissioners and the company they are to be submitted to arbitration, the decision of the board to be binding upon all parties. Each party is to select an arbitrator, the third being selected by these two or by a judge of the Court of Appeals of Franklin County. The board must render its decision within thirty days unless all members agree to an extension.

## Getting Up Booklets That Create Traffic

ALMOST every electric railway has issued booklets to guide strangers in reaching points of interest and at the same time induce them to use the street cars. It is often questioned whether such advertising really promotes traffic, but that it does has been proved in Denver. This city, of course, has the advantage of being a great tourist stopping point. In making up advertising booklets, J. C. Davidson, publicity manager, has capitalized this fact.

One of the booklets used some time ago by the Denver Tramway, entitled "What to See in Denver," secured a material amount of traffic which the company would not have obtained otherwise. The success was largely due to the manner in which the information was set forth and to the method of distribution. A small boy above the average in intelligence was employed to meet every important tourist train between 6 a. m. and 9.30 p. m. each day during the entire summer. He was dressed in a uniform with a cap bearing the word "Information." As the tourists came out of the depot, he approached them, saying he wished to give them a booklet about Denver. A total of 50,000 copies was distributed during three months by this means.

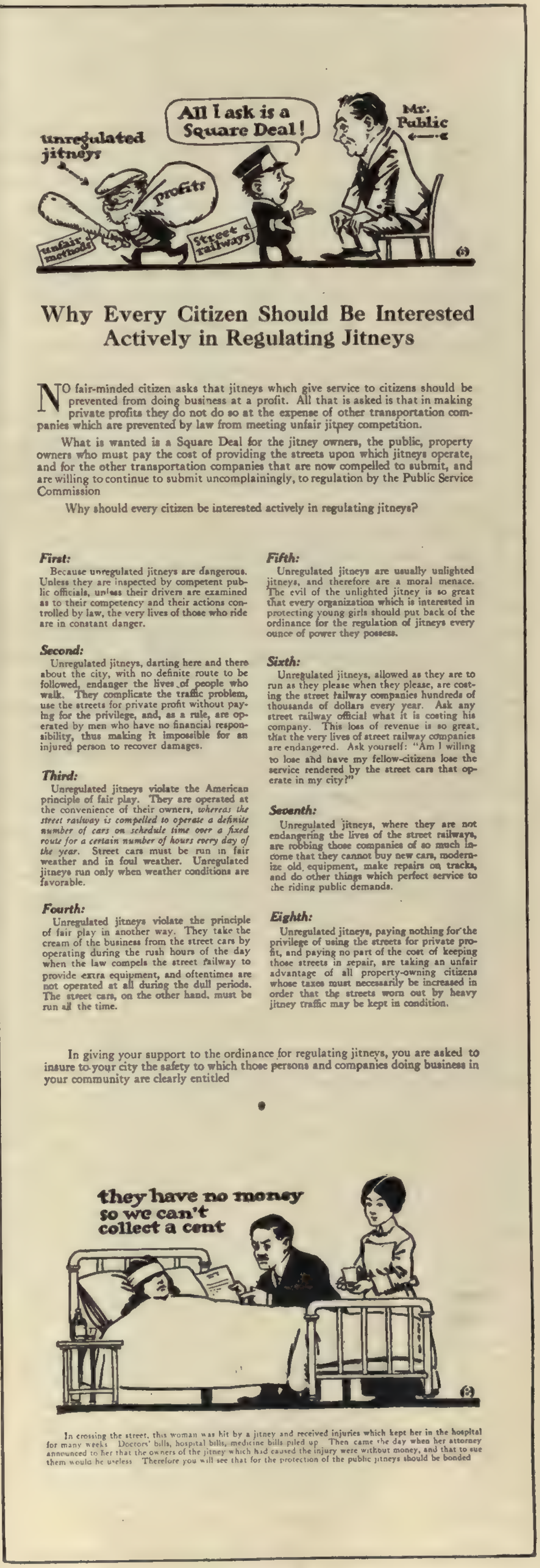
When the tourist opened this booklet, he found trips listed to points of interest in Denver, routing him from the Union Station and back again, and giving the time required and the cost. Forty-four trips were listed in this manner. The booklet also contained many pictures, and the reading matter pointed out the interesting things en route.

A booklet which created a great deal of traffic from local residents was entitled "Prize Picnic Places." To attract people who could not afford long interurban rides but were tired of going to city parks for outings, Mr. Davidson set about finding new picnic spots on the electric railway system. Through the company's car pamphlet, *"Tram-o-Grams,"* prizes were offered for information as to new picnic spots. From sixty-four replies forty good picnic spots were selected, twenty or more being practically unknown. When a leaflet regarding these was prepared, with pictures and directions, a goodly amount of new traffic was secured.

## Jitneys Should Be Regulated

THE circular reproduced in the opposite column summarizes in a striking way the reasons why the public should be interested in the regulation of jitney traffic. Six thousand of these circulars were sent out by the Bay State Street Railway, Boston, Mass., to its employees. In each case the circular was inclosed with the current issue of *Triangle Talks*, the employees' publication.

Copies of the circular were also stacked up in the waiting rooms of the company. Others were inserted in all outgoing letters. Moreover, the publicity department furnished the newspapers in the company's territory with electros of the cuts, and many of them reproduced the circular. All this has helped to make the public better understand what a "fair deal" to electric railways means.


unregulated jitneys
All I ask is a Square Deal!
Mr. Public
profits
unfair methods
street railways
they have no money so we can't collect a cent

### Why Every Citizen Should Be Interested Actively in Regulating Jitneys

NO fair-minded citizen asks that jitneys which give service to citizens should be prevented from doing business at a profit. All that is asked is that in making private profits they do not do so at the expense of other transportation companies which are prevented by law from meeting unfair jitney competition.

What is wanted is a Square Deal for the jitney owners, the public, property owners who must pay the cost of providing the streets upon which jitneys operate, and for the other transportation companies that are now compelled to submit, and are willing to continue to submit uncomplainingly, to regulation by the Public Service Commission

Why should every citizen be interested actively in regulating jitneys?

***First:***

Because unregulated jitneys are dangerous. Unless they are inspected by competent public officials, unless their drivers are examined as to their competency and their actions controlled by law, the very lives of those who ride are in constant danger.

***Second:***

Unregulated jitneys, darting here and there about the city, with no definite route to be followed, endanger the lives of people who walk. They complicate the traffic problem, use the streets for private profit without paying for the privilege, and, as a rule, are operated by men who have no financial responsibility, thus making it impossible for an injured person to recover damages.

***Third:***

Unregulated jitneys violate the American principle of fair play. They are operated at the convenience of their owners, *whereas the street railway is compelled to operate a definite number of cars on schedule time over a fixed route for a certain number of hours every day of the year.* Street cars must be run in fair weather and in foul weather. Unregulated jitneys run only when weather conditions are favorable.

***Fourth:***

Unregulated jitneys violate the principle of fair play in another way. They take the cream of the business from the street cars by operating during the rush hours of the day when the law compels the street railway to provide extra equipment, and oftentimes are not operated at all during the dull periods. The street cars, on the other hand, must be run all the time.

***Fifth:***

Unregulated jitneys are usually unlighted jitneys, and therefore are a moral menace. The evil of the unlighted jitney is so great that every organization which is interested in protecting young girls should put back of the ordinance for the regulation of jitneys every ounce of power they possess.

***Sixth:***

Unregulated jitneys, allowed as they are to run as they please when they please, are costing the street railway companies hundreds of thousands of dollars every year. Ask any street railway official what it is costing his company. This loss of revenue is so great that the very lives of street railway companies are endangered. Ask yourself: "Am I willing to lose and have my fellow-citizens lose the service rendered by the street cars that operate in my city?"

***Seventh:***

Unregulated jitneys, where they are not endangering the lives of the street railways, are robbing those companies of so much income that they cannot buy new cars, modernize old equipment, make repairs on tracks, and do other things which perfect service to the riding public demands.

***Eighth:***

Unregulated jitneys, paying nothing for the privilege of using the streets for private profit, and paying no part of the cost of keeping those streets in repair, are taking an unfair advantage of all property-owning citizens whose taxes must necessarily be increased in order that the streets worn out by heavy jitney traffic may be kept in condition.

In giving your support to the ordinance for regulating jitneys, you are asked to insure to your city the safety to which those persons and companies doing business in your community are clearly entitled

In crossing the street, this woman was hit by a jitney and received injuries which kept her in the hospital for many weeks Doctors' bills, hospital bills, medicine bills piled up Then came the day when her attorney announced to her that the owners of the jitney which had caused the injury were without money, and that to sue them would be useless Therefore you will see that for the protection of the public jitneys should be bonded

EIGHT REASONS PROVING NEED FOR JITNEY REGULATION

# New York Line Presents Case

### New York & North Shore Traction Company Tells First District Commission Why It Needs a Seven-Cent Fare

On July 16 the New York & North Shore Traction Company, Roslyn, N. Y., began and finished the presentation of its direct case on its application to the Public Service Commission for the First District for an increase in fare from 5 cents to 7 cents. As noted in the ELECTRIC RAILWAY JOURNAL of July 14, this company has been granted a fare increase on its zone system in Nassau County, and it now is seeking relief for its lines in Queens County, New York City.

The company presented more than fifty exhibits to show its financial and operating status. The fixed asset account of the company as of Dec. 31, 1908, adjusted to meet commission requirements, was $358,735. Between then and June 30, 1917, there was added under commission supervision $1,253,272, making a total of $1,612,008. All of this, according to J. G. Moran, secretary and general manager, represents used and useful property except $1,100, the original cost of a lot purchased for a substation which was not built.

The securities approved, issued and outstanding total $1,779,350. The difference between this and the fixed assets of $1,612,008 is represented by discount on bonds, materials and supplies, cost of bonds deposited with the city and other items for which securities were allowed but which were ordered credited to fixed capital and written off through a suspense account.

Beginning with July 1, 1915, the company set aside a reserve of three-quarters of 1 per cent of the gross receipts for depreciation of equipment and 1.5 per cent for depreciation of way and structures. If this rule had been in force since the beginning of complete operation in 1910, the accrued depreciation, the company estimates, would amount to $16,587 for way and structures and $8,303 for equipment. With the straight-line method at 3 per cent a year, the total accrued depreciation would be $262,463.

According to the company's comparative income statement since the year ended June 30, 1911, the gross income was as follows: 1911, $28,568; 1912, $40,307; 1913, $19,302; 1914, $39,365; 1915, $49,560; 1916, $49,803, and 1917, $39,638. After paying interest on bonds, rentals and other deductions, the income available to the holders of stock ($150,000 for 1911-1913; $979,350 for 1914-1917) was as follows: 1911, $19,369; 1912, $21,582; 1913, $7,317 (deficit); 1914, $7,432; 1915, $3,211; 1916, $2,032, and 1917, $8,882 (deficit). The company has never paid any cash dividends, and at no time has earned a fair return. The increases already granted by the Second District Commission are estimated to yield $8,850 of additional revenue, and that desired from the First District Commission $34,605.

Council for the commission brought out the fact that the company will be confronted with rapid transit competition in Queens County when the city program is completed. The commissioners then asked why it would not be advisable to adopt a zone system in this section instead of a 7-cent fare. Mr. Moran said that as far as the communities were concerned a zone system could be used on the lines in Queens County as well as on those in Nassau County, but that the company now has only P.-A.-Y.-E. cars operating in Queens County, and also that a 7-cent fare would give more revenue now. When rapid transit competition developed, it would be time to discuss any needed way of meeting it. The hearing was adjourned until July 23 to enable the city to prepare cross-examination if it so wishes.

The beginning of the hearings on the applications of the Staten Island Midland Railway and the Richmond Light & Railroad Company for a 6-cent fare was postponed from July 16 to Sept. 10.

# Jurisdiction Partly Admitted

### New York Second District Commission Grants Power to Raise Rates Above Old Legal Maximum—No Opinion Yet About Cases Involving Franchise Rates

The Public Service Commission for the Second District of New York announced on July 18 at Albany a partial decision as to its power to grant an increase in fare from 5 cents to 6 cents to twenty-eight petitioning electric railways in its jurisdiction.

The commission stated that as to all cases pending before it in which authority to increase rates does not involve determination of the effect of alleged contracts or franchise restrictions as to such rates, it is of the opinion that it has authority in a proper case to permit an increase of fare in excess of the maximum fixed by the railroad law. This in substance prohibited street surface railways from charging any passenger more than 5 cents for one continuous ride from any point on its road or on any road, line or branch operated by it or under its control to any other point thereof or of any connecting branch thereof within the limits of any incorporated city or village.

In regard to applications for leave to increase rates which if granted would authorize a rate in excess of that alleged to have been fixed under contract with or by a franchise granted to and accepted by the railway corporation, the commission made at this time no determination as to its jurisdiction. It is not known now how many cities will raise this issue, but the fact will probably become apparent when the commission resumes its hearings on July 25.

As to the method of procedure in cases to be taken up in accordance with the foregoing, and in cases which may be taken up in pursuance of further determination that may be made by the commission as to its jurisdiction in any of the pending applications, the commission stated that the burden of proof is upon the railways to establish that the present maximum rates are unjust and unreasonable. Moreover, they must show that with due regard among other things to a reasonable average return upon the value of the property actually used in the public service and to the necessity of making reservation out of income for surplus and contingencies, the proposed rates properly should be approved and fixed by the commission as just and reasonable.

The Public Service Railway, Newark, N. J., has paid to the city of Newark $199,948, which represents 5 per cent of the gross income from fares within that city during the past year. The sum exceeds that paid in 1916 by $22,297. The Newark anniversary celebration had a considerable effect upon the year's earnings.

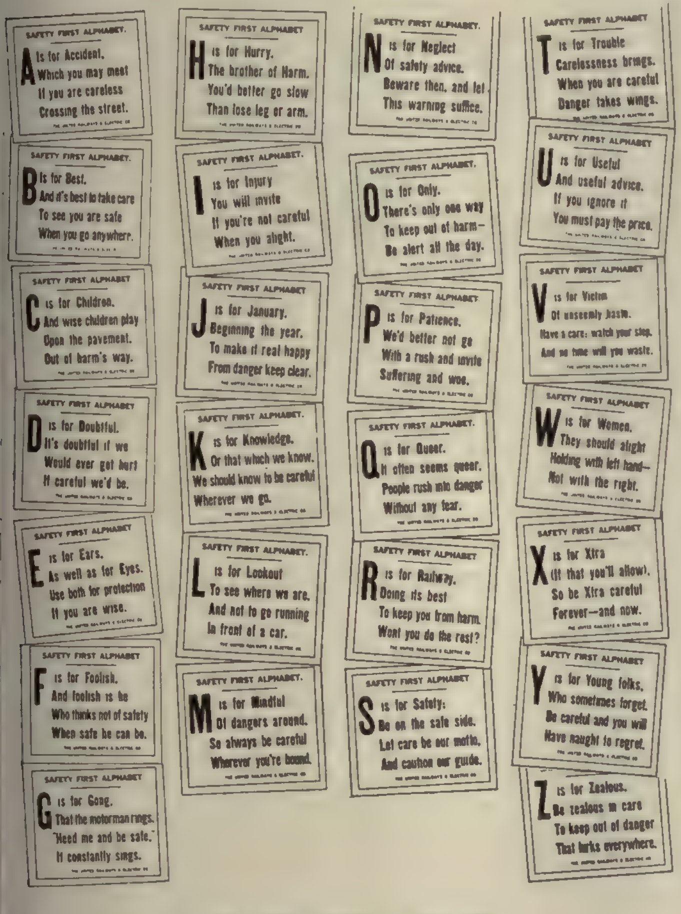
# Safety from A to Z

## How the United Railways & Electric Company Has Told the Story of Safety Through the Alphabet

THE United Railways & Electric Company, Baltimore, Md., has for years, in the course of its varied safety work, kept in its cars racks for the display of large cards. The most recent set of cards, which are described by Dwight Burroughs, publicity manager, in the June *United Railways Forum*, were those used for a "safety alphabet."

This alphabet was designed with simple words and catchy jingles, so that the verses, as shown in the accompanying cut, might be read and remembered by children as well as adults. When the first letter appeared, the company began to receive communications from all sorts of self-constituted literary critics. While the comments and criticisms were rolling in, however, something else was happening.

Every boy and girl in the city was learning verse "A." It went into the homes and was discussed. People could not help remembering it and wondering what the next verse would be. Verses "B" and "C" met with the same reception, and so the alphabet went on performing its mission of attracting attention to safety.



SAFETY FIRST ALPHABET.
A is for Accident.
Which you may meet
If you are careless
Crossing the street.

SAFETY FIRST ALPHABET.
B is for Best.
And it's best to take care
To see you are safe
When you go anywhere.

SAFETY FIRST ALPHABET
C is for Children.
And wise children play
Upon the pavement.
Out of harm's way.

SAFETY FIRST ALPHABET
D is for Doubtful.
It's doubtful if we
Would ever get hurt
If careful we'd be.

SAFETY FIRST ALPHABET
E is for Ears.
As well as for Eyes.
Use both for protection
If you are wise.

SAFETY FIRST ALPHABET
F is for Foolish.
And foolish is he
Who thinks not of safety
When safe he can be.

SAFETY FIRST ALPHABET
G is for Gong.
That the motorman rings.
"Heed me and be safe."
It constantly sings.

SAFETY FIRST ALPHABET
H is for Hurry.
The brother of Harm.
You'd better go slow
Than lose leg or arm.

SAFETY FIRST ALPHABET.
I is for Injury
You will invite
If you're not careful
When you alight.

SAFETY FIRST ALPHABET
J is for January.
Beginning the year.
To make it real happy
From danger keep clear.

SAFETY FIRST ALPHABET.
K is for Knowledge.
Or that which we know.
We should know to be careful
Wherever we go.

SAFETY FIRST ALPHABET.
L is for Lookout
To see where we are.
And not to go running
In front of a car.

SAFETY FIRST ALPHABET.
M is for Mindful
Of dangers around.
So always be careful
Wherever you're bound.

SAFETY FIRST ALPHABET.
N is for Neglect
Of safety advice.
Beware then, and let
This warning suffice.

SAFETY FIRST ALPHABET.
O is for Only.
There's only one way
To keep out of harm—
Be alert all the day.

SAFETY FIRST ALPHABET.
P is for Patience.
We'd better not go
With a rush and invite
Suffering and woe.

SAFETY FIRST ALPHABET.
Q is for Queer.
It often seems queer.
People rush into danger
Without any fear.

SAFETY FIRST ALPHABET
R is for Railway.
Doing its best
To keep you from harm.
Won't you do the rest?

SAFETY FIRST ALPHABET
S is for Safety:
Be on the safe side.
Let care be our motto,
And caution our guide.

SAFETY FIRST ALPHABET
T is for Trouble
Carelessness brings.
When you are careful
Danger takes wings.

SAFETY FIRST ALPHABET
U is for Useful
And useful advice.
If you ignore it
You must pay the price.

SAFETY FIRST ALPHABET
V is for Victim
Of unseemly haste.
Have a care: watch your step.
And no time will you waste.

SAFETY FIRST ALPHABET
W is for Women.
They should alight
Holding with left hand—
Not with the right.

SAFETY FIRST ALPHABET
X is for Xtra
(If that you'll allow).
So be Xtra careful
Forever—and now.

SAFETY FIRST ALPHABET
Y is for Young folks.
Who sometimes forget.
Be careful and you will
Have naught to regret.

Z is for Zealous.
Be zealous in care
To keep out of danger
That lurks everywhere.

BALTIMORE SAFETY ALPHABET

Soon the principals of various public schools asked for the cards so that they could be used for the purpose of instilling the safety idea among the pupils.

At a night school in northeast Baltimore, attended chiefly by aliens, some of them adults, the principal uses the cards as an aid in teaching the English language and safety at the same time. The school found that it could get from the cards a vocabulary of simple words which enabled the pupils to converse in English without other mediums.

The cards were used at the Central Y. M. C. A. in connection with a class in safety. Several churches and Sunday schools employed the cards to teach the safety lesson at entertainments. Individuals secured sets of the cards for the instruction of children in their families.

Thus, while the safety alphabet was performing its mission in the racks in the cars, it was also entering the schools and homes of the city with its simple message—a message not easily forgotten.

# COMMUNICATION

## Paving Is Sometimes a Proper Charge

SOUTHWESTERN ELECTRICAL & GAS ASSOCIATION
DALLAS, TEX., July 16, 1917.

To the Editors:

I have read with much interest Mr. R. C. Cram's article on "What Shall We Do with the Paving Burden?" and the editorial on this article, both in your issue of June 23. Within the last year or two I have spent considerable time examining track and paving in a large number of cities, in size from forty and fifty thousand population to those of a quarter of a million, and I have been very greatly impressed by two important conditions. The first of these is the effect of track construction on the useful life of its abutting pavement. The second is the wonderfully changed results caused by the recent almost exclusive operation of self-propelled rubber-tired vehicles over city pavements. Perhaps I can better illustrate my impressions in this matter by giving the views of the city engineer of a large city which I lately visited. These views have since been duplicated by those of many other city engineers and by city officials who have control of streets and roadways.

In talking with this engineer on the subject of paving I said that it had always seemed to me inequitable to compel the railways to pay for the installation, maintenance and renewal of the pavement in and abutting their track when the operation of the cars on this track in no wise used or injured the pavement and when, as an actual fact, steel-tired wagons used the rails as a wheel-way. His reply was virtually as follows:

"That may be partially true under certain conditions and a portion of it may have been absolutely true in the past, but the situation has changed considerably within the last few years, partly in favor of the railways but partly against them. The part in favor is that the railways have begun to realize that the so-called 'elastic' or 'resilient' track with 'ballast' under it is a 'pavement destroyer,' as it allows to the track a slight vertical movement which is not shared by the pavement, so that the track sooner or later parts company with paving, to the detriment of both. Hence the nearer the railways make their track and their pavement one integral structural unit, the longer will be the life of both.

"The second condition is the change caused by self-propelled rubber-tired vehicles. We have in this city two streets on which there is very little steel-tired or animal traffic. These two streets are approximately the same width, they are very nearly parallel for a long distance, and there is no great difference in the undersoil or the grades. Both are paved with the same character of pavements, viz., a plastic pavement with crushed stone filling, laid on concrete at about the same time and by the same contractors. One has no railway track on it; on a large portion of the other there is a single track, laid with grooved rail, and with turnouts. As both streets lead from about the same section in the heart of the city to the same manufacturing suburb, the traffic on each is a matter of choice. As the heavy trucks selected the street without the railway tracks just as soon as it had been paved, the lighter traffic, such as automobiles and fast operating delivery wagons, etc., uses the street with the railway track. Both these streets were paved about three or three and one-half years ago, and to-day the street without the track, and which has the heavier vehicular traffic, is in perfect condition, while that which has the railway track is commencing to have bad places closely adjacent to the rails, caused partly by the repairs which had to be made to the joints in the track and partly by the fact of the movement of the track in the pavement, this track being of the 'elastic' type with rail joints.

"Therefore I feel in this particular case, and it is duplicated in other parts of our city and in many other cities, that the electric railway is fully responsible on the one of these streets where it operates for all the repairs which will have to be made between its rails and for 2 ft. outside of them—if, indeed, it should not pay for the repavement of the entire street when the original pavement needs renewal. There are several types of pavement which, if properly laid on streets without railway tracks, will, with rubber-tired self-propelled vehicles, last almost indefinitely and with very slight repairs. This cannot be said of a similarly paved street where the pavement is cut longitudinally by two or four rails as this 'cutting' will by itself weaken the pavement and shorten its life beyond what it would be if it were an integral and unbroken whole."

These remarks are worth consideration by all electric railways. If there is one thing that is absolutely unstandard it is the matter of track construction and paving in city streets. All other structures are built according to thoroughly established engineering principles, yet the average city railway track with its superimposed paving is the only "structure" which is not built in accordance with the best engineering principles and practice, and it is the one which, of all street railway structures, should be so built because it is subject to more diverse stresses and strains than any other one of the structures.

Let the good work of the JOURNAL and Mr. Cram go on, but let it proceed in such a manner that it will point out not only where the railways have been at fault in laying their tracks so that the addition of their tracks to a street actually shortens the life of its paving, but also whether it is actually possible, under the present and coming conditions of the other vehicular traffic, so to construct the track and its paving that that track will not be a detriment to the street paving as a whole. The vital point is: that if this can be done, all future tracklaying must be so done and, if it cannot be done, the electric railways must make up their minds that they will—equitably and justly—have to pay not only all costs of paving over their tracks but, possibly, the supplemental damage caused to the whole street paving by their track. This condition is looming up in the mind of those controlling municipal paving. No good wil come from ignoring it. If there is a method of avoiding it, let it be found as soon as possible. If there i no such method, let us face the alternative and forefend it in every legitimate way.

H. S. COOPER, Secretary.

## Texas Claim Agents Meet

Texas interurban lines and city lines were well represented at the meeting of the Railway Claim Agents Association of Texas at Galveston on July 13 and 14 R. L. Miller of the Northern Texas Traction Company of Fort Worth read a paper on the effect of pay-as-you enter cars and one-man cars in reducing accidents. Mr Miller said that both served greatly to reduce the accidents caused by persons attempting to board or aligh from moving cars, explaining that with either car, i properly constructed, it is impossible for a person t attempt to board or alight from a car until the door i opened.

The handling of unreported claims against street railways was discussed by F. J. Johnson, chief adjuste for the San Antonio Traction Company, and K. M Watson, general claim agent for the Northern Texa Traction Company. The best method of handling claim resulting from train or street car wrecks and severa other topics were discussed by traction men.

# AMERICAN ASSOCIATION NEWS

## Public Utility Conference

Delegates have been selected to represent the American Electric Railway Association at the conferenc at Washington, D. C., to consider the provision of the war revenue bill that relate to public utilitie Those who will represent the association are L. S. Storr E. G. Connette, J. N. Shannahan and E. B. Burritt.

## Why We Should Have Increased Revenue

The above was the topic discussed at the meeting o the Connecticut County section on June 27. This meeting was held at a local hotel and was preceded by dinner served to 110 members. The section orchestr furnished music during the dinner.

The necessity for increased revenue was explaine and illustrated in papers by L. S. Storrs, president J. H. Sanford, purchasing agent; W. R. Durham, Jr. engineer maintenance of way; Leslie Spraggon, inspector of rolling equipment; W. E. Jones, statistician; A S. Davis, supervisor of power, and C. H. Chapman, manager Bridgeport division. A chart prepared by th statistician showed how the company's expenses ha increased compared with earnings, and how the net income had decreased for corresponding months this yea and last. The accident record of the company and th nature of liability cases on the docket at the time wer also treated by the assistant attorney of the company S. W. Baldwin, and the attorney, J. F. Berry.

# EQUIPMENT and MAINTENANCE

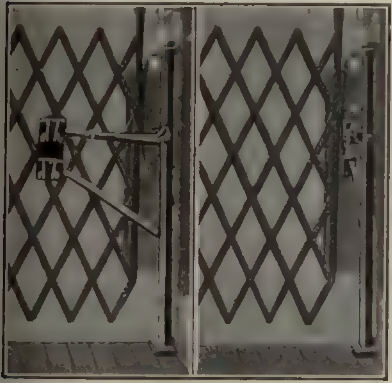
HAVE YOU A GOOD WAY OF DOING A JOB?
*—Pass It Along*

*Read in This Issue:* The First Installment of the Cost Data on Special Work Renewals, by M. Bernard

## Inexpensive Fare-Box Bracket and Window Sign

BY C. S. BANGHART
Vice-President and General Manager Binghamton (N. Y.) Railway

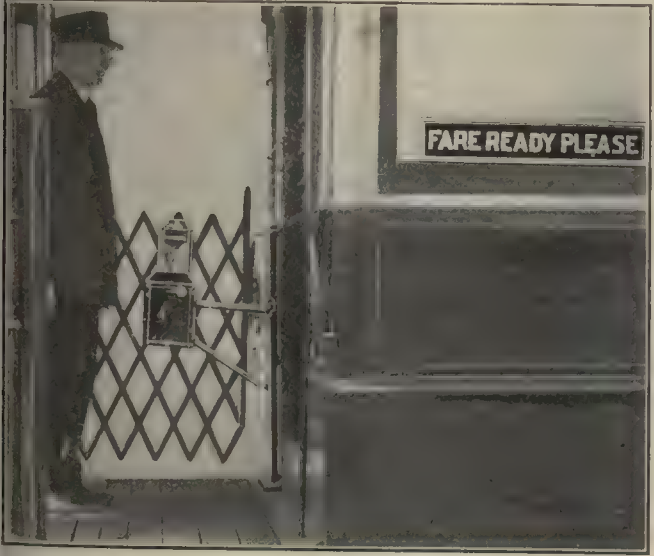
Prepayment fare boxes have recently been installed in some of our old open-platform cars by means of a swinging bracket shown in the illustration. This is arranged so that it can swing back and be securely fastened against the bulkhead when the fare box is used on the other end of the car.



VIEW OF BRACKET WITH FARE BOX REMOVED, AND VIEW OF BRACKET IN OUT-OF-THE-WAY POSITION

The sockets into which the fare box fits are electrically welded to an iron plate which in turn is welded to the bracket pipe supports. The cost of the job was only $2 per car, making a very cheap way of altering the old cars so they could be used as trippers and for emergency service with the other equipment, which is practically all of the prepayment type.

The cars are loaded at the rear end and unloaded at the front. The sign "Fare Ready, Please," which is shown in one of the illustrations, is not painted on the window, but is printed on a strip of paper, using white letters on a black background. The paper is then glued to the window pane. This has proved to be an inexpensive sign and at the same time it is very effective as the white letters are illuminated at night by the car lights, which make them very distinct.



INEXPENSIVE FARE-BOX BRACKET AND PAPER WINDOW SIGN

## Anti-Fouling Guards for Trolley Wheels

To prevent trolley wheels from being caught in overhead work with consequent tearing down of the construction or the distortion of wheel flanges, the United Railroads of San Francisco has devised the anti-fouling shields shown above.

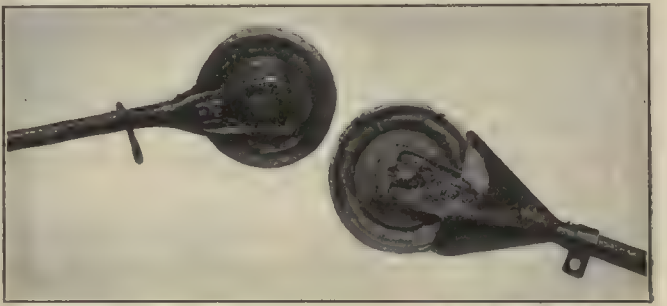


Photo by Mentz, San Francisco

TROLLEY HARP BEFORE AND AFTER APPLICATION OF ANTI-FOULING GUARD

The shield is made of two pieces of No. 12 sheet steel shaped on the dies shown in the illustration and fastened on each side of the trolley harp. The two sections are then welded together.

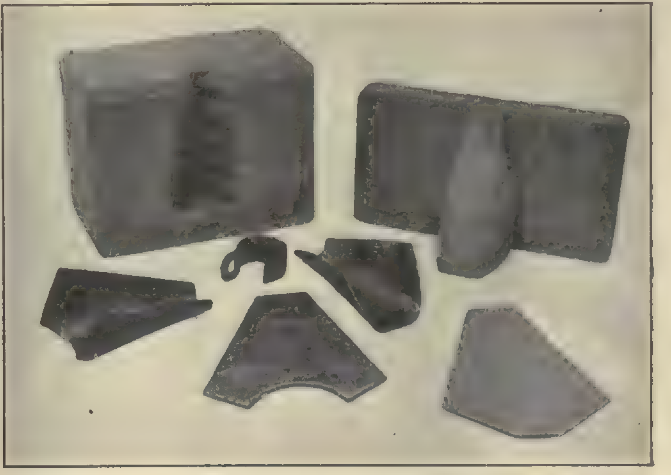


Photo by Mentz, San Francisco

SHAPING DIES AND COMPONENT PARTS OF ANTI-FOULING GUARD

# Cost Data on Special Work Renewals—I

**In Various Articles Published in Engineering Periodicals It Is Very Striking to Note the Absence of Any General Information Showing the Cost of Renewing Special Work**

By M. BERNARD
Assistant Engineer Way & Structures Department,
Brooklyn (N. Y.) Rapid Transit System

IT is evident that this subject has not received the consideration it deserves, since the cost of special work maintenance amounts to one-third at least of total track maintenance, exclusive of paving. The writer, therefore, with the hope of stimulating the publication of similar costs from other properties, has compiled a large number of cost data concerning the renewal of the various layouts of special work and plain curves. These data are the average of a large number of actual jobs. The costs include pavement restoration except where there is a 2-ft. strip of asphalt outside the outer rails, in which case the restoration of this strip is not included. The data on two kinds of plain curves are given below, and the remaining costs will be given in succeeding issues.

In order that these data may be of maximum use, an explanation of the terms used in the compilation follows: By "light traffic" is meant either the divergence of cars during progress of work, or a traffic of not more than 150 cars per day of twenty-four hours. "Average traffic" denotes the passage of about 325 cars per day of twenty-four hours, and "heavy traffic" that of 750 or more.

By "labor" is meant the labor cost of tearing out the old paving and special work and installing the new at the location where the work is done. "Handling" signifies the cost of loading the necessary materials at the various storage yards as well as the unloading of same at the place of renewal. It also includes the cost of transportation and the cost of removal of old or left-over material. Since the transportation is done by a subsidiary company, which adds profit and overhead expense to the net cost, this item may differ considerably from that obtained on other railways. Under "miscellaneous" are included the expense of city inspectors, expense incurred when portable crossovers are used for divergence of cars during renewal, watchmen's wages, and incidental engineering expense. The total of these three items—labor, handling and miscellaneous—therefore includes everything except the cost of materials.

On account of the unsettled labor conditions prevailing since the beginning of the war, the costs given are based on pre-war wages, the average track labor on which these costs are based being taken at 20 cents per hour.

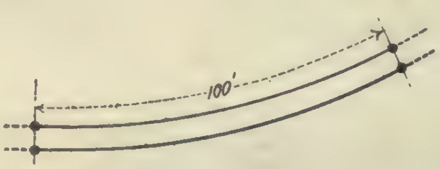


**Fig. 1—Single Track Plain Curve (flat)**

Length—100 ft. single track
Construction removed—9-in. girder rail—8-in. granite on sand
New construction—7-in. girder rail—5-in. granite on concrete
Pavement outside of track—Granite on concrete

| | Light Traffic | Average Traffic | Heavy Traffic |
|---|---|---|---|
| Labor .................... | $144.00 | $175.00 | $195.00 |
| Handling ................ | 75.00 | 90.00 | 100.00 |
| Miscellaneous ............ | 28.00 | 35.00 | 40.00 |
| Total (except materials) . | $247.00 | $300.00 | $335.00 |
| Cost per single track foot.. | 2.47 | 3.00 | 3.35 |

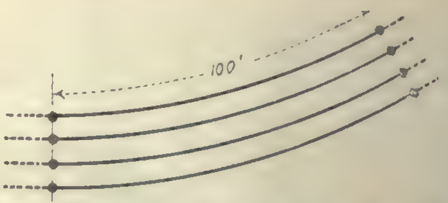


**Fig. 2—Double Track Plain Curve (flat)**

Length—100 ft. double track
Construction removed—9 in. girder rail—8-in. granite on sand
New construction—7-in. girder rail—5-in. granite on concrete
Pavement outside of track—Granite on concrete

| | Light Traffic | Average Traffic | Heavy Traffic |
|---|---|---|---|
| Labor .................... | $290.00 | $360.00 | $405.00 |
| Handling ................ | 160.00 | 190.00 | 225.00 |
| Miscellaneous ............ | 60.00 | 75.00 | 85.00 |
| Total (except materials) . | $510.00 | $625.00 | $715.00 |
| Cost per single track foot.. | 2.55 | 3.13 | 3.58 |

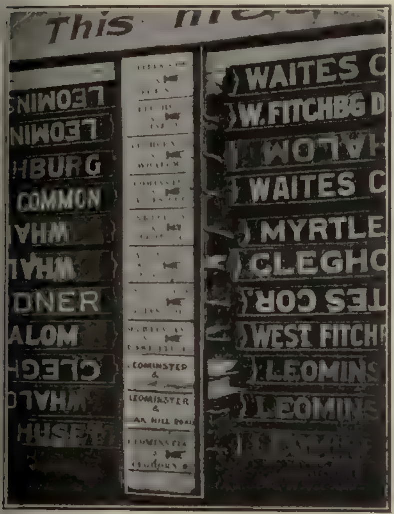
ADDITIONAL COST DATA TO BE GIVEN IN SUCCEEDING ISSUES

## Compact Rack with Horizontal Classification and Storage of Car Signs

BY W. P. LISH

Master Mechanic Fitchburg & Leominster Street Railway, Fitchburg, Mass.

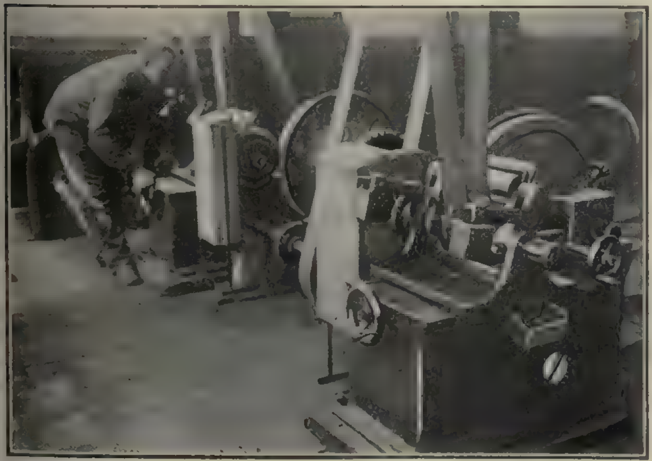
Six hundred and sixteen car signs can be stored in a space but 15 ft. long and 5 ft. high, at the main carhouse of this road, by the use of the rack shown in part in the accompanying illustration. The signs are classified by horizontal sets of guide signs about 5 in. x 9 in. in size, mounted at the left-hand side of each section of the vertical storage panels as shown. Fourteen signs of a particular designation may be stored in each compartment, the latter being formed by ⅜-in. iron rods, bent as shown in the illustration and attached to a wooden frame of 2-in. x 1¼-in. members. Four vertical groups of signs suffice for the company's service at this point. As this rack is different in many respects from the one described in the issue of the ELECTRIC RAILWAY JOURNAL for March 31, 1917, page 607, I thought it would no doubt be of interest to your readers.



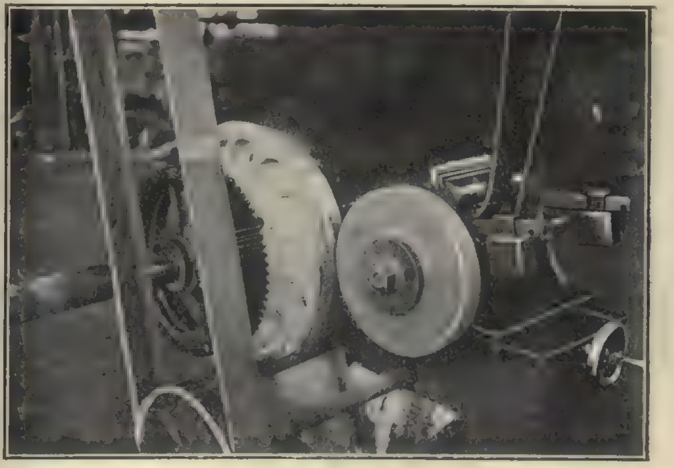
RACK WHICH FACILITATES HANDLING OF CAR SIGNS IN FITCHBURG

## Wheel Grinding Made a Pleasure by Use of Dust Guards

Until recently one of the most unwelcome jobs in the shops of the San Francisco-Oakland Terminal Railways was the grinding of chilled-iron wheels. The emery dust had a most disagreeable way of impairing the cleanliness and health of the operator besides messing up the surroundings. All of this has now been overcome by equipping the grinding machine with an exhaust box by which all dust is led to a barrel of water just outside the shop wall. The paste formed by the water and emery is used for filling in low spots around the yards.



WHEEL GRINDING MACHINE EQUIPPED WITH DUST GUARDS FOR PROTECTION OF OPERATOR



WHEEL GRINDING MACHINE WITH DUST GUARD REMOVED TO SHOW FLUE WHICH CARRIES AWAY IRON DUST

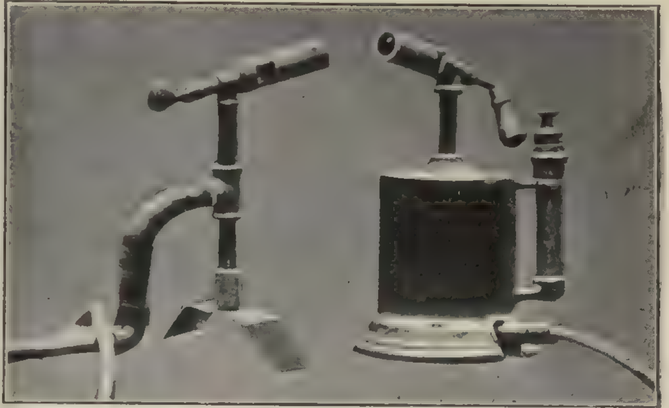
## Gas Versus Gasoline Torches for Paint Removal

BY HENRY MEYER

Master Mechanic Beaver Valley Traction Company, New Brighton, Pa.

In our shops we have found that gas torches make a better means of burning off old paint from car bodies than the commonly-used gasoline blow torches.

The accompanying illustration shows a home-made gas burner and a gasoline torch that has been converted for use with illuminating gas instead of gasoline. The gas connections for these burners are overhead, the tubing is light, and consequently the operator states that where formerly his left arm used to tire in cleaning paint from the car body on account of the weight of the gasoline in addition to the weight of the blow torch, now his right arm, which he uses for scraping, tires first because there is no stopping to pump up the air pressure. We have also found these gas burners to be desirable both from the standpoint of the time saved in cleaning off the paint and in the reduction of the fire risk in the company's shops.



TWO TYPES OF HOME-MADE GAS BURNERS USED BY THE BEAVER VALLEY TRACTION COMPANY

# Overhead Kinks from Cleveland

## Threadless Pull-Over Casting, Spring for Trolley-Trough Hangers, Glass-Insert Section Insulators and Other Practical Devices

The first installment of the Cleveland overhead kinks was published in the July 14 issue of the Electric Railway Journal, page 64. The second and final installment, given below, describes several more ingenious pieces of overhead equipment which have been devised by James Scott, superintendent of overhead.

### Threadless Pull-Over

A pull-over casting so designed that it may be installed without the use of any tool other than a hammer is shown in Fig. 1. It may be used with an ear having a specially designed shank, or the ordinary pull-over ear can be adapted for use with this pull-over casting by screwing a plug into the shank. A 13/16-in. hole in the pull-over slips over the shank of the ear and a small steel wedge, 2½ in. long, is driven into the square hole provided in the casting for this purpose. The wedge, when driven in, locks with the groove in the shank of the ear and holds it permanently in place. The wedge is given a pitch of ¼ in. in 2½ in. This pull-over greatly facilitates replacements under heavy traffic conditions since the ear does not have to be removed and it is only a moment's work to drive in the wedge.

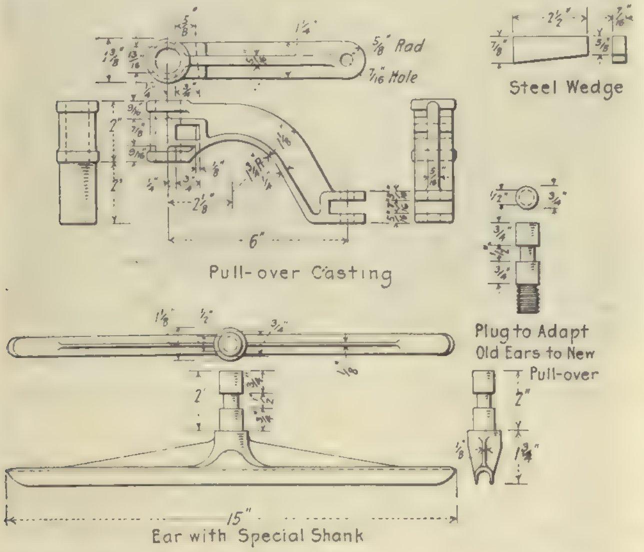


FIG. 1—DETAILS OF THREADLESS PULL-OVER CASTING AND EAR WITH SPECIAL SHANK

### Spring Hanger for Trolley Troughs

A special hanger designed to eliminate the constant flashing which is seen at viaducts or wherever there is rigid overhead construction is shown in Fig. 2. The hanger consists of an ordinary ear attached to a long steel spring which is fastened rigidly at one end by means of two insulated bolts through the trolley trough, and supported at the opposite end by a single bolt on which it is free to slide. As the trolley wheel approaches this ear the spring provides some flexibility and prevents the recoil of the trolley wheel which results when the wheel strikes a perfectly rigid support. Some freedom of action vertically is also given by the ½-in. space provided between the bolt head and the fiber washer next to the trough.

### Screw Ear Designed for Perfect Alignment

An ear which will permit of an extra one-quarter or one-half turn in order to make it come into perfect alignment with the trolley wire is shown in Fig. 3. In the ordinary threaded ear, it is necessary to either use spring washers or frequently to leave the ear slightly loose in its threaded connection with the hanger in order that it may be straight with the wire. In this new ear the extra quarter or half turn is gained by the construction at the top of the shank. Two schemes are used for accomplishing this purpose. In one case the inside of the shank is beveled off above the thread to give a very thin sharp edge at the top. In the other case a series of sharp teeth are cut in the face of the shank. In either case the uppermost edges which come in contact with the hanger first will turn over slightly as the ear is screwed tight, thus allowing the ear to be tightened into perfect alignment with the wire.

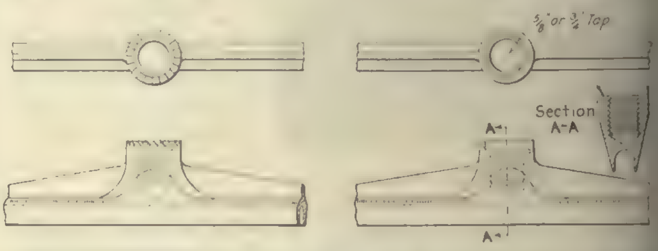


FIG. 3—TWO TYPES OF TROLLEY EARS DESIGNED TO GIVE PROPER ALIGNMENT WITH THE TROLLEY WIRE

### Glass-Insert Section Insulator

The substitution of a glass insert for the usual fiber section is the principal feature of a new design section insulator shown in Fig. 4. The method of fastening this glass section to the hickory block by means of clips bolted to the block is clearly shown in the drawing. The glass is cast with special holes for fastening purposes. The approaches on this section insulator are made of brass castings, which are also bolted to the hickory block insulating section. The purpose of the glass insert, which is renewable separately from the remainder of the insulator, is to prolong the life of the sectionalizing insulator. The fiber block which is ordi-

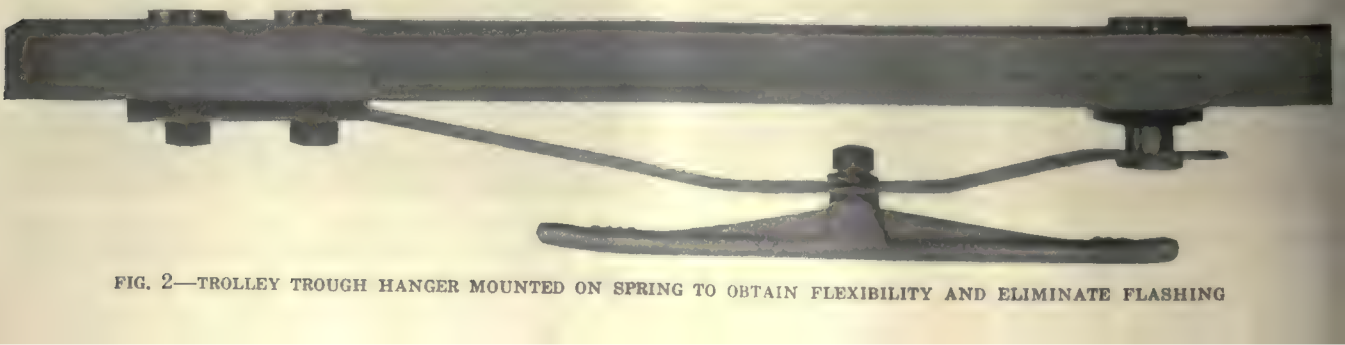


FIG. 2—TROLLEY TROUGH HANGER MOUNTED ON SPRING TO OBTAIN FLEXIBILITY AND ELIMINATE FLASHING

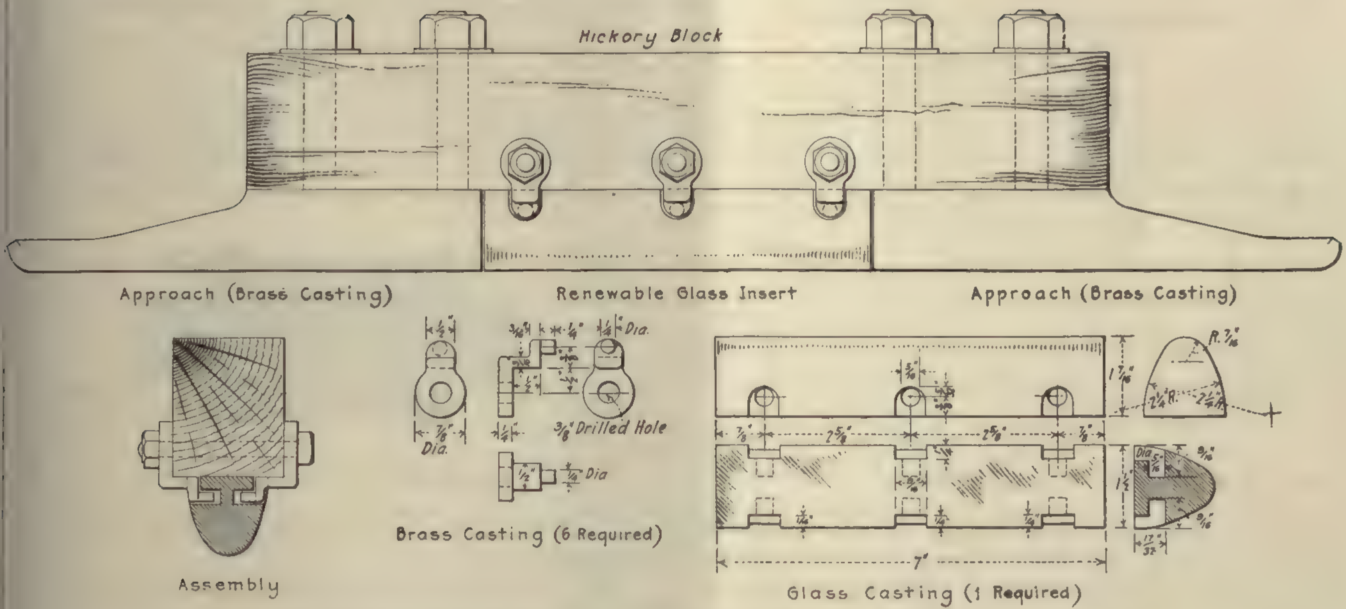


FIG. 4—SECTION INSULATOR WITH GLASS INSERT MOUNTED BETWEEN BRASS APPROACHES

narily used for this purpose is rapidly burned away by the arc which is pulled from the brass casting as the trolley wheel leaves it with the controller in the "on" position. The life of the glass insert is much longer since it does not burn away. Little trouble has been experienced with breakage of the glass.

A number of the special fittings described above have been manufactured for Mr. Scott by the Drew Electric & Manufacturing Company, Indianapolis, Ind.

### Concrete Paint for Protecting Span Wire

Mr. Scott has been experimenting with the use of concrete paint on span wire to prevent rusting. This concrete paint is a thin mixture of very rich concrete and is applied with a brush so that it fills up the space between the strands of the span wire. Span wire which was thus protected more than a year ago and has received no attention since shows no signs whatever of corrosion, nor has the concrete paint fallen off the wire as the result of the vibration.

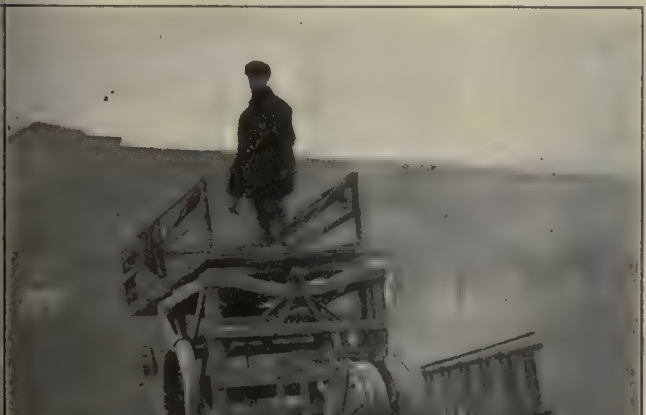


FIG. 5—TYPICAL LINE TRUCK OF CLEVELAND RAILWAY

### Line Trucks

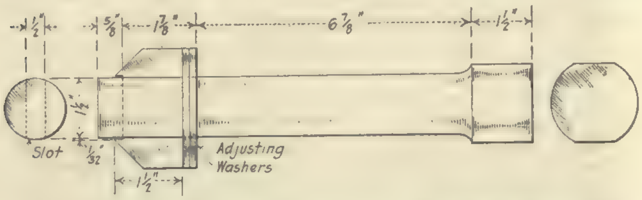
The type of line trucks used by the Cleveland Railway is shown in Fig. 5. These trucks are manufactured by the Detroit-Wyandotte Motor Car Company of Wyandotte, Mich., and they are so equipped that two men can handle practically any overhead job which may arise. At night frequently the entire work, including driving of the truck and repair of overhead, is done by one man. The tower platform may be swung around to extend in the opposite direction from that shown. The end of a new section of wire can be taken from the reel in the back end and clamped to the trolley wire, and the truck can be run along the track and a new section of trolley wire strung with a very short delay to traffic. The two reels in the truck are of capacity sufficient to carry 1600 ft. of span wire and an equal amount of No. 00 trolley wire. Their location at the rear of the truck facilitates their use. A brake provided on each makes it possible to use them for holding the wire taut while fastening it.

### Feeder Cable Divided at Street Crossing

A simple means of dividing the load into two parts where it was necessary to carry a 1,000,000-circ. mil. cable across the street was accomplished as follows: At the next to the last pole on the first side of the street the 1,000,000-circ. mil. cable was connected to two 500,000-circ. mil. cables. One of these was spanned across the street at this point and the other was carried on the next pole and then across the street. At this point the two were joined in the 1,000,000-circ. mil. cable again. This construction made it possible to use the ordinary concrete poles at the corner without any additional reinforcing, while if the 1,000,000-circ. mil. cable had been carried across at one point it would have been necessary to put in some very heavy construction, as there was no space in which to guy the corner pole.

## Pin Substituted for Equalizer Spring Bolt

The Elmira Water, Light & Railroad Company has in service some Brill 27-GE-1 trucks on which trouble was experienced because of the rapid rusting of the nut on the equalizer spring bolt. The thread of the bolt became badly worn too so that adjustment was impossible.



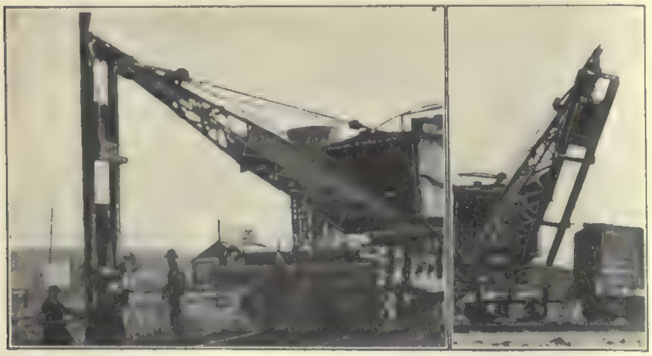
PIN AND WEDGE USED IN PLACE OF EQUALIZR SPRING BOLT

To remedy this the pin and wedge shown in the illustration were substituted for the bolt and nut. Adjustment is now made by means of shims or washers between the wedge and the bolster spring seat rocker.

## Ditcher Used as a Pile Driver by Western Railway

A ditcher has been used successfully by the Spokane & Inland Empire Railroad to drive stub poles and piles. The pile-driving attachment, which was made in the company's shops at a total cost of $34.09, consisted of 8-in. x 8-in. x 18-ft. leads, braced with two ½-in. x 6-in. wrought-iron bands and connected across the top with a 1-in. x 6-in. iron strap. This was suspended from the end of the ditcher boom by an eyebolt, which was attached to two pieces of ½-in. angle iron bolted on either side of the end of the boom. The line for the hammer, which weighed 2145 lb., ran over a sheave, which was also supported by the two angles. When en route the lower end of the leads was pulled in by a cable, so that the pile-driving attachment lay on the under side and nearly parallel with the boom, the hammer being held in place at the upper end. Views of the apparatus in the operating and traveling positions are shown below.

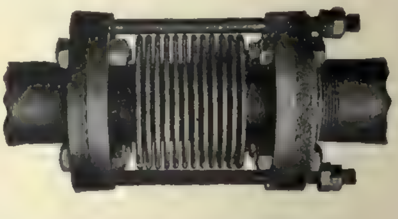
With this arrangement it is possible to drive piles or stub poles on either side of a double-track line without having to transfer the ditcher from one track to the other. Stubs can be placed on either side, in front of, or behind a pole, and this at less than 25 per cent of the former cost. The ditcher used was made by the American Hoist & Derrick Company of St. Paul, Minn.



DRIVING A PILE WITH A DITCHER—PILE DRIVER IN POSITION SO THAT THE DITCHER CAN BE MOVED

## One-Piece Expansion Joint

Taking up pipe expansion by means of loops and U-bends requires considerable extra space as well as extensive construction, while stuffing boxes and long sweep joints require frequent attention and repacking to avoid leaking. These difficulties are avoided in the use of the one-piece expansion joint illustrated here-



EXPANSION JOINT OF NEW DESIGN

with, which is the product of the R. D. Nuttall Company, Pittsburgh, Pa.

The corrugations are machined from the solid blank instead of being molded or bent into shape, and while the thin steel walls require careful machining, the result is a strong non-leaking joint, which is readily responsive to small amounts of expansion or contraction in the pipe line. The action in the joint is the same as that of an accordion or bellows. This joint requires but a small amount of additional space for installation, and as the expansion in the pipe is taken up by the corrugations, there are no stuffing boxes to be taken care of.

## Paving Track Intersection with Old Ties

The New Orleans Railway & Light Company, of which M. V. Houlard is superintendent of tracks, has had excellent results from the use of old creosoted ties for paving some steam-road track intersections. The accompanying view shows the appearance of the street surface at a double-track intersection with a steam railway single-track line. The paving at this intersection had been installed for about a year. This paving consists of sound old ties adzed to fit the back of the rails and closely fitted into the steel work. This form of paving for intersections has the advantages of low first cost, smooth surface, comparatively long life, and the tight blocking of the 6-in. wooden floor serves to maintain the position of the parts of the special work.

OLD CREOSOTED TIES USED FOR PAVING AT A STEAM-ROAD AND ELECTRIC RAILWAY INTERSECTION IN NEW ORLEANS

# News of Electric Railways

Traffic and Transportation
Financial and Corporate — Personal Mention — Construction News

## Strikes in Tacoma and Seattle

### Men in Tacoma Go Out, Followed by Seattle Men, Who Were Engaged in Arbitrating Their Differences

Three hundred members of the union organized recently among the trainmen of the Tacoma Railway & Power Company, Tacoma, Wash., went on strike on July 16 when L. H. Bean, manager of the company, refused to recognize the union. At midnight on July 16 about 1800 employees of the Puget Sound Traction, Light & Power Company, Seattle, went on a sympathetic strike, following the refusal of A. W. Leonard, president of the Seattle company, to intervene in the Tacoma situation and the refusal of L. H. Bean, manager of the Tacoma company, to reinstate seven employees alleged to have been dismissed because of their activities in organizing the local men at Tacoma.

The transportation systems in both cities were paralyzed on July 17. Every available vehicle was brought into use. Peaceful pickets were stationed by the employees at all points of advantage. The police were detailed for the protection of the company properties. There was no violence up to the night of July 17. Interurban trains between Seattle, Tacoma, Everett and way points were run as usual. The municipal line of the city of Tacoma serving tide flats industries, operated by the Tacoma company under lease, and the car line to the army cantonment at American Lake were both completely tied up. The business men and the civic bodies of the city brought pressure to bear at once on the officials of the companies to have them accede to the requests of employees. The settlement of the strike in both cities hinges largely on recognition of the union. The Seattle strike affects, in addition to the platform men, the members of eleven affiliated unions including electricians, blacksmiths, engineers, carpenters, painters and linemen.

#### COURT DIRECTS SERVICE BE RESUMED

No cars were operated in Seattle up to July 20. An alternative writ directing the Puget Sound Traction, Light & Power Company to resume service in Seattle was signed on July 19 by Judge Boyd J. Talman of the King County Superior Court. This writ was made returnable on July 23. The petition was presented to Judge Talman by Corporation Counsel Hugh M. Caldwell of the city. It asked that in the event the company failed to operate cars the men be punished for contempt of court and a receiver be appointed to take charge of and operate the lines subject to the order of the court, until the company established that it could operate its lines.

The company gave the employees until July 20 to apply for reinstatement without loss of rank. President Leonard of the company stated that service would be resumed in Seattle at once if adequate protection was guaranteed by the city. Mayor Gill promised protection by threatening the arrest of any strike breakers brought in by the company. Company officials stated that fifty former employees had applied for reinstatement. This was denied by the officers of the unions.

Meanwhile the question of transportation has become intensely acute. As an emergency measure the court has accordingly granted temporary permission for the operation of jitneys. Motor trucks and private cars were also pressed into service to handle any surplus of passengers beyond the ability of the jitneys to care for.

It was asserted on July 19 that the employees of the Stone & Webster properties in Bellingham and Everett had asked the Seattle union to assist in organizing the men in those cities. It was considered likely at that time that the strike would be extended to those cities.

Ten cars were being operated under guard in Tacoma on July 20. No violence was reported from that city.

Until the strike of the Tacoma employees, the outlook in Seattle was that the differences between the Seattle company and the employees would be settled by arbitration. Two members of the arbitration board had been appointed. Later the men declared in favor of settling as many questions as possible by conciliation, and on this account the third arbitrator had not yet been chosen.

#### SEATTLE ARBITRATION

Negotiations started long before the strike of July 16 for a settlement of the differences previously existing between the Puget Sound Traction, Light & Power Company, Seattle, and its employees were well under way on July 13 when the material intended for use in this issue of the ELECTRIC RAILWAY JOURNAL was dispatched by mail from Seattle by the resident correspondent of the paper in that city. At a recent meeting between the committee representing the trainmen and President Leonard of the company revised requests were presented by the employees. The statement was made that the demands of the trainmen had not been changed, but that the situation had been altered by all the other organized crafts working for the company making an effort to effect a blanket agreement with the company providing for increased wages and an eight-hour day and closed shop conditions which implied recognition of the Amalgamated Association. The members of the committees were endeavoring to agree on as many points as possible so as to reduce the work of the arbitration board, as stated in the account of the strike in Seattle, and so overcome, if possible, the need for calling in the third arbitrator.

#### PRESIDENT LEONARD ON SEATTLE SITUATION

A. W. Leonard, president of the company, in speaking of the situation on July 13 was reported to have said:

"We depend on arbitration. The conferences and conciliation meetings by the company's officers with representatives of the employees can only pave the way for the final arbitration to which we have agreed of the formal demands made by the trainmen and filed on June 23. Those demands were made specific. Arbitration of wages and working conditions was agreed to, and two members of the board of arbitration have been named, James A. Duncan by the employees, and C. J. Franklin by the company. On July 3 an additional list of dmands from employees of many other departments was presented. The company has recognized the changed living conditions by announcing three voluntary wage advances to trainmen in a period of three months, and a 40 per cent reduction in the term of service required to reach the maximum wage, meaning an increase of 14 per cent to trainmen at an annual cost of $140,000 to the company. All of these concessions were made prior to the presentation of any formal demand upon the part of the employees. They were made in the interest of the public, of better service to the public, by making employment more desirable, that the company might be assured an adequate and dependable supply of efficient labor with which to maintain that high standard of service which has always been our aim and purpose."

#### WAGES PAID IN TACOMA

The new wage scale which went into effect in Tacoma on July 1 was reviewed in the ELECTRIC RAILWAY JOURNAL of July 7, page 32. The second increase was granted on June 1. Subsequently the company announced a still further increase in wages effective on July 15 to the following scale: First six months, 27 cents; second six months, 28 cents; second year, 29 cents; third year, 30 cents; fourth year, 31 cents; fifth year, 32 cents; sixth year and thereafter, 34 cents.

# St. Louis Ordinance Put Over

## Further Conferences with Company Decided Upon by City Officials Before Measure Goes to Aldermen

The plan miscarried which had been proposed for the introduction into the Board of Aldermen of St. Louis, Mo., on July 13 of the ordinance for the settlement by compromise of the questions at issue between the city and the United Railways under the general terms outlined in the ELECTRIC RAILWAY JOURNAL of July 14, page 71. Postponement of the introduction of the measure was brought about by Mayor Kiel. He is said now to believe that serious objection will be raised to the provisions of the new grant to the company under which the city becomes a partner of the company in so far as the measure does not guarantee the payment of the amount of the mill and the occupational taxes. Meanwhile the Board of Aldermen has voted to adjourn from July 27 to September. So far as formal consideration of the franchise matter by the elected representatives of the city is concerned this would seem to put the matter over until the fall.

Louis P. Aloe, president of the Board of Aldermen and ex officio member of the Board of Estimate and Apportionment, called attention, at a meeting of that body on July 13, to the fact that the city is not guaranteed a specific revenue under the draft agreed upon by the city and the railway. Mr. Aloe declared that this omission was fatal to the success of the bill, and Mayor Kiel and Mr. Nolte thereupon started an inquiry into the situation. City Counselor Danes and C. E. Smith, engineer for the city, were summoned. The Mayor decided to take the matter up with the officials of the company and announced that he would call another meeting of the conference for the night of July 16. When it was found advisable to hold up the bill to take up the question of insertion of a clause guaranteeing the payment of $485,000 to the city annually, the printing of the bill was suspended. The officials had expected to distribute copies of the bill, but it was decided to give out no draft of the measure until it is finally perfected.

### ALTERNATIVE PROPOSAL SUGGESTED

The joint conference in the office of the Mayor on the evening of July 16 between the officials of the city and the representatives of the company resulted in throwing the whole street railway franchise situation wide open again. An alternative ordinance is now proposed providing an entirely new plan of settlement of the franchise and mill tax problems and eliminating the city as a partner of the company. In brief, the proposal now is to validate the company's existing franchise to 1948, require the company to pay to the city 3 per cent of its gross receipts annually, permit the company to pay the accrued mill tax of $2,300,000 in ten annual payments and require the company to make many extensions and betterments. It was announced that an effort would be made to have the Aldermen consider both the new ordinance and the city partnership plan on July 20. The public will be permitted to express its choice and suggest amendments or changes. It is stated unofficially that the plan advanced on July 16 would not make necessary a financial readjustment of the company, as the city would not under the terms of the grant be interested as a partner in the financial or operating problem of the company. It is said that under the non-partnership plan the revenue to the city from the company would be decreased about $100,000 a year at present, but that later it would be in excess of the present payments. It is understood that at the meeting on July 16 the company refused to guarantee that under the city partnership plan the city's share of the profits would be at least $485,000 a year.

The Civic League of St. Louis is opposed to the proposed settlement with the company as is also organized labor. A committee representing the Civic League has declared that the proposed arrangement would be detrimental to the municipality and the company. The chairman of the committee which announced its dissent is Charles W. Bates, former city counselor. There are also on this committee Joseph L. Hornsby, former chairman of the Public Service Commission of St. Louis, which made an appraisal of the property of the company in 1912, and William F. Woerner, author of the mill tax ordinance and former member of the Public Service Commission of Missouri. They cite nine counts in their opposition to the measure. Attorney-General Frank W. McAllister has announced that he had been asked, as a state official, to investigate the ordinance by which the city will become a partner of the company.

### PRESIDENT MORTIMER REVIEWS SITUATION

James D. Mortimer, president of the North American Company, issued the following statement concerning the United Railways:

"The settlement of the mill tax and franchise difficulties was first undertaken by the United Railways in 1911. An ordinance providing for a lump sum settlement of accrued mill tax, a reduction in the future tax and a confirmation of the franchise rights until 1948 was recommended by a special committee of the St. Louis Municipal Assembly in 1911, but failed of passage before the main body. Since that time the St. Louis public has gradually come to believe that the mill tax and franchise matters should be settled, and at the last municipal election the successful candidates for office openly avowed their intention of promptly settling all disputes between the city and the company.

"The city officials have taken the lead in the negotiations now in progress and have drafted a form of franchise ordinance somewhat similar to the so-called Kansas City plan. It provides for a new fifty-year franchise, a joint board of control, and a division of the surplus earnings in excess of agreed percentages on the initial utility capital, and on all future accretions. If an ordinance can be agreed to and is passed by the Board of Aldermen, the company proposes to offer this to all the security holders and ascertain if the necessary adjustments in the financial structure of the company can be made to comply with the terms of the ordinance. The initial utility capital will probably be fixed at $60,000,000 or $65,000,000 and the face amount of all outstanding securities will probably have to be reduced to a figure approaching a sum as finally agreed upon.

"There are now outstanding on the property $11,350,000 face amount of underlying bonds, $9,800,000 of St. Louis Transit 5's due in 1924, $30,350,000 of general mortgage 4's due 1934, and $4,500,000 of Suburban Railway general 5's due 1923, making a total in round figures of $56,000,000 face amount. There are outstanding in the hands of the public $16,379,900 par value of 5 per cent cumulative preferred stock and $24,913,800 par value of common stock, a total of $41,293,700. The total capitalization is accordingly about $97,000,000. If the finances of the company are adjusted so that the face amount of outstanding securities approximates the $60,000,000 or $65,000,000 of initial utility capital proposed by the city in the present franchise negotiations, there will have to be a reduction of $32,000,000 to $35,000,000 in the face amount of securities at present outstanding.

"The St. Louis Transit Company 5's, the United Railways general mortgage 4's, and the Suburban Railway 5's, are selling at substantial discounts under par. All these mortgages are closed except in so far as they may be used for the retirement of underlying issues and afford no means for financing capital requirements. All such money during the last ten years has been provided from the earnings of the company.

"Should the franchise negotiations now in progress result in arrangements with the city which the company can properly recommend to its security holders, there will have to be adjustments in the amount of junior bond issues outstanding and in the amounts of preferred and common stock. That it will be suggested to the holders of general mortgage 4's that the face amount of their securities be reduced has been sensed for some time past and has been responsible for the formation of the committee, announcement of which was made on July 9. It is reported that committees to represent the other junior bond issues have either been formed or are in process of formation.

"The preferred shareholders have a committee, but it has not yet asked for the deposit of stock. The North American Company is interested only in the common stock, of which it owns about 72 per cent; it will ask other holders of common stock to join with it in any plans for reorganization which may be promulgated."

## Massachusetts Investigation Opened

### Special Commission Which Is to Report to the Legislature of 1918 Begins Its Work

The street railway investigation commission created by Chap. 129, Massachusetts Resolves, 1917, held its first public hearing on July 10 at Boston. Senator J. W. Martin, Jr., presided. The commission is required to study the general problems of street railway administration and financing and report to the 1918 Legislature in January with special reference to improving the economic condition and usefulness of the companies now in operation in the State. Among counsel who registered were Bentley W. Warren, for the Massachusetts Street Railway Association and the New England Street Railway Club; James F. Jackson, for the Bay State Street Railway, and Robert H. Holt for the Boston Elevated Railway.

### COUNSEL FOR COMPANY STATES CASE

A preliminary statement by Mr. Warren emphasized the freedom of the Massachusetts lines from over-capitalization and the desire of the companies to furnish the fullest possible information to the commission. He pointed out that the present financial condition of the roads was almost a matter of common knowledge. As an instance of the need of improved credit conditions the speaker said that the West End Street Railway (the Boston surface lines) for many years regarded as a most conservative trustees' investment has recently been forced to issue bonds at 6 per cent interest. The Springfield Street Railway, for many years considered one of the strongest companies in the State, was now before the Public Service Commission seeking the right to issue 6 per cent bonds. Its last issue of bonds was fifteen years ago, and a 4 per cent return then easily attracted a market. Boston Elevated Railway stock, representing a paid-in investment of $110 per share, was selling for $60, and the company was near the end of its financial resources. These conditions meant a complete cessation of development and also a steady deterioration of plant. Higher charges for the service were absolutely necessary. The investing public was shunning street railways because it felt that the State was not interested in seeing that these public utilities were enabled to earn a proper return.

Mr. Jackson advised the commission that the Bay State company was opposed to the present system of street railway taxation in Massachusetts with reference to the excise and commutation taxes. Evidence bearing upon electric railway freight and express development and possibilities will also be presented later. Mr. Jackson, who was formerly chairman of the Massachusetts Railroad Commission, declared that in general the securities of the Massachusetts railways stood as properly representative of the actual investment.

In a communication to the commission suggesting various lines of inquiry into street railway management and administrative methods, former Senator R. M. Washburn intimated that the commission might find itself, after the investigation, to be the first Massachusetts tribunal unanimously to advocate as perhaps the proper remedy for present conditions a 6, 7 or 8-cent fare. This meant courage and perhaps political suicide. The hearing was adjourned to July 24 at Boston.

## Strike in Lima

Electric railway traffic at Lima, Ohio, has been at a standstill since July 11, when fifty motormen and conductors on the local line of the Ohio Electric Railway went out on strike. The men demanded the abolishment of split runs and a reduction of the workday to nine hours, together with an increase in wages from 24 to 28 cents and from 25 to 30 cents an hour. H. G. Gilpin, general manager, agreed to increase the maximum wages, but said he could make no change in the minimum figure. He also stated that improvements would be made in working conditions. The men refused to accept his offer.

The company attempted to operate cars on July 16. The strikers attacked the cars. The attempt to resume service was finally given up and the cars were run back to the carhouse.

## Four Extensions to Be Built in Cincinnati

At a special meeting on July 13 the Council of Cincinnati, Ohio, ordered extensions to four of the Cincinnati Traction Company's lines. Their construction will mean the expenditure of upward of $250,000 before the end of the year.

Walter A. Draper, vice-president of the Cincinnati Traction Company, objected to the extension of the North Norwood line at this time, because of the excessive cost involved, but was unable to convince Council on this point. He said the extension would necessitate the construction of a new substation at a cost of $37,000 and the purchase of power from the Union Gas & Electric Company, or the location of a complete substation equipment and the construction of a new transmission line from the Pendleton power station to Blair Avenue at an estimated cost of $101,000. He declared that to the cost of either project must be added $15,000 for additional cars and an annual operating expense of $37,960.

At a meeting of the Federated Improvement Association on July 12, P. A. Pursell, president of the California Improvement Association, made at attack on the Cincinnati Traction Company because of the terms made to interurban lines for the use of its tracks and power. He declared the company received 3 cents out of each 5-cent fare collected by the interurban lines and thus kept them out of the city. He said further that residents of California, which is now part of the city, are compelled to pay a 10-cent fare between that place and the business section of the city.

## Railway a Political Issue

### Cleveland Mayoralty Candidates Seek to Ride Into Public Favor on the Back of the Cleveland Railway

Mayor Harry L. Davis of Cleveland, Ohio, who is a candidate for re-election on the Republican ticket, insists that everything possible should be done to retain the 3-cent fare, although the increased cost of materials and labor renders it more and more difficult to do so. He says that the company should exert every effort to overcome its present difficulties until the new substation in Cedar Avenue is completed. In his opinion the placing of this plant in operation will tend to keep the expenses down, as the new contract with the Cleveland Electric Illuminating Company for power will then become effective.

Edmund B. Haserodt, Democratic anti-organization candidate, charges that the Davis administration has pushed the street railway question into politics again by exerting every effort to maintain the 3-cent fare. He thinks that with municipal ownership an increase in the rate of fare could be avoided.

### THREE-CENT FARE PROBABLY MUST GO

William A. Stinchcomb, Democratic organization candidate, thinks that it is impossible to preserve the 3-cent rate much longer. He says that the Tayler grant does not provide for 3-cent fare alone, but specifically states that the people shall be entitled to transportation at cost plus 6 per cent for dividends on the company's stock. Mr. Stinchcomb said that under Tom L. Johnson the 3-cent fare became a slogan, but workmen were then receiving $1.75 a day, whereas their wages are now $3 a day.

Hugh F. Taylor, president of the Union Wire & Iron Works, and an independent candidate for Mayor, says the 3-cent fare should be preserved. He is having a booklet prepared, reviewing the street railway situation.

John J. Stanley, president of the Cleveland Railway, told the newspaper men that the prospect of continuing the 3-cent rate would be better, if the daily load carried by the road could be more evenly distributed through the twenty-four hours of the day. If the present rate of fare is to continue, the earnings per car mile must be increased, or the cost of operation per mile must be reduced. Cost of operation can be kept down only by not improving the service as traffic increases, or by a better distribution of the load.

## Strike on Syracuse Suburban Lines

Strikes of the employees of the Syracuse, Lake Shore & Northern Railway and the Syracuse & Northern Electric Railway, Inc., Syracuse, N. Y., were called on July 4. The matter of wages had previously been the subject of conferences between the managers of the roads and the representatives of the employees, and in spite of the fact that progress was being made toward a new working contract the union men on July 3 demanded an immediate raise in pay from 32 cents to 35 cents an hour under threat of calling out the men on the holiday. The company offered to arbitrate, but this proposal was rejected and the men quit work.

On July 6 there was a conference in Syracuse between T. C. Cherry and William J. Harvie, general managers of the railways, and members of the State Board of Mediation at which the managers placed before the board the formal statement made previously by them to the public. This statement said that the men were receiving the prevailing wage scale in the vicinity; that their wages had been raised twice within a year and five times within seven years. The financial status of the companies was also gone into and reference made to the appeal of the companies to the Public Service Commission for increases in fares.

At a meeting of the employees on July 9 it was decided to accept the proposal of the companies to arbitrate, which policy the railroads urged from the first. A board of two arbitrators was agreed upon. Service was resumed on July 11.

Carlton A. Chase was chosen to the board of arbitration to represent the railways and Erasmus A. Pellenz was selected to represent the men. They went into conference at once to see if the matter could not be settled by conciliation without the need of choosing an umpire. In this they succeeded, for on July 14 they handed down a decision awarding the men an advance of 1½ cents an hour. This means an increase from 32 to 33½ cents an hour. The original demand of the men was for 7 cents more an hour. The new wages will be written into the contracts to be executed in the near future. The advance in wages is retroactive to May 1.

## Improving Seattle's Municipal Railway

### Four Bills Passed by the City Council Looking Toward Important Changes in the Present System

The development of Seattle's municipal street railway system was provided for by the City Council recently by the passage of four bills, one authorizing the construction of an extension to Division "A" into Ballard; one providing for the connection of Divisions "A" and "C", by an elevated line across the south end of the city; one for the changing of the trolley system on Division "A" from a double to single wire, and the fourth appropriating funds from the city lighting department depreciation fund, as a temporary loan to the municipal street railway bond fund. On each of these four bills the Council received a minority report made by Councilmen R. H. Thomson and Will H. Hanna. The minority held that it would not indorse the railway extension until figures could be produced showing whether the proposed projects would pay. The final vote on the bills was seven to two, Messrs. Thomson and Hanna voting against the measures. The bill for the extension of the municipal railway into Ballard calls for the construction of a new line, beginning at the north end of the Lake Washington Canal bridge, and extending along Fifteenth Avenue N. W., and Leary Avenue. The bill provides an appropriation of $25,000 for this work. The sum of $5,000 is appropriated for the changing of the trolley system on Division "A."

The measure for the elevated line provides for the construction of a viaduct, with the necessary grades and approaches on Washington Street, Whatcom Avenue, Railroad Avenue and West Spokane Street. According to estimates of Councilman Oliver T. Erickson, father of the project, the construction alone, minus cost of condemnation proceedings, will approximate the expenditure of $330,000. Councilman Erickson introduced in Council an ordinance appropriating $25,000 from the city lighting department depreciation fund to the municipal street railway bond fund as a temporary loan. In the words of the ordinance, which was referred to the finance and city utilities committees, "there are insufficient money in the municipal street railway bond fund to carry on work heretofore authorized, and to be authorized in the improvement of the city street railway system, and in the purchase and installation of equipment necessary for the proper and economical operation of such system."

The Council has passed an ordinance appropriating $25,000 for the purchase of eight one-man cars.

A. H. Dimock, city engineer, submitted to the Council a communication estimating the cost of constructing the proposed elevated line at $330,068, provided the construction is of wood. Mr. Dimock estimated the cost of extending Division "A" into Ballard at $27,320, with a number of provisos.

## Toronto Strike Settled

### Men Out Two Days and a Half—Temporary Increase of Six Cents Pending Arbitration

The strike of the employees of the Toronto (Ont.) Railway, which commenced at midnight on July 10, was settled on the night of July 12. Service was resumed at noon on July 13. The men, who had been receiving 26, 28 and 30 cents for first, second and third year's service respectively, asked the company last April for an increase of 10 cents all around and a closed shop. The men based their demands on the increase in the cost of living since the war began. The committee of the employees commenced negotiations with the company last April in anticipation of completing an arrangement before the agreement between the men and the company expired on June 16. The company voluntarily increased the men's wages last winter 2½ cents all around. It took under consideration the latest request of the men, and a number of conferences were held with the committee of the employees. Finally an offer was made by the company of an increase of 2 cents all around. This offer was considered by the men at a mass meeting on July 7, and was declined. By an almost unanimous vote the union then presented an ultimatum to the company in which it announced that if the company did not grant the request for an increase of 10 cents as demanded the men would go on strike on July 10. The company refused to better its concession beyond 2 cents all around, but offered to leave the wage and all other questions to a board of arbitration. This proposal was rejected by the men in mass meeting on July 10, and the strike commenced at midnight.

The Ontario government brought about a conference between the officials of the company and the men's union, and, as a result, the company made an offer of a temporary increase of 6 cents an hour all around, pending the submission of all matters in dispute to a board of conciliation under the Lemieux act. This offer was accepted on July 12 by the men, and service was resumed at noon on July 13.

In accordance with the settlement arrived at, the employees' committee selected as their representative on the board of conciliation, D. A. Carey, president of the Labor Temple Company and a well-known labor man throughout Canada. The directors of the railway, at a meeting on July 16, appointed Duncan McDonald, formerly manager of the Montreal Tramways, to represent the company. These two will follow the usual practice and select a third member. In case of their failure to agree upon a suitable person, the Minister of Labor has the power under the act to appoint the third member of the tribunal.

The following table shows how the new temporary wages compare with the old scales:

| | 1912, Old Agreement, Cents | Rate as Advanced January, 1917, Cents | Men's Demands, Cents | Wages Pending Arbitration, Cents |
|---|---|---|---|---|
| Motormen and conductors: | | | | |
| First six months | 23½ | 26 | 36 | 32 |
| Second six months | 25½ | 28 | 38 | 34 |
| Second year and after | 27½ | 30 | 40 | 36 |
| Motor and truck repair men: | | | | |
| First six months | 23½ | 26 | 36 | 32 |
| Second six months | 25½ | 28 | 38 | 34 |
| Second year and after | 27½ | 30 | 40 | 36 |
| Shedmen | 23½ | 26 | 36 | 32 |
| Foremen | 27½ | 30 | 40 | 36 |
| Assistants | 22½ | 25 | 35 | 31 |

## Cleveland Terminal Defeated

The subway and underground terminal ordinance of Mayor Davis of Cleveland, Ohio, was defeated by the City Council on the evening of July 16 by a vote of fifteen to ten. The street railway committee reported adversely on the ordinance. An analysis of its reasons brought out two points. One was that the ordinance would place the whole matter in the hands of an independent committee and the other that it would remove the work from political consideration.

The vote was strictly on party lines, although one Democrat, Councilman Damm, voted with the Republicans for the ordinance. He said he felt that he had no right to deny his constituents the right to an expression on the subway proposition.

Councilman Gahn announced that initiative petitions would be circulated at once and that the question would be placed before the voters at the November election, whether or not the majority of Councilmen thought well of it. The Mayor told the Council that this movement would have his support.

The ordinance called for the construction of a subway from the terminus of the underground bridge approach on Superior Avenue to the Public Square, an underground terminal station for all lines at the Public Square, a bond issue of $3,500,000 to pay for the construction and a street railway commission to supervise the work. The plan is similar to the one now in operation in Cincinnati. The whole issue would have been submitted to the voters at the fall election.

## Preparing for Operation of New Dallas Franchises

With the understanding that the new franchises will soon become effective in Dallas, Tex., under which the electric railways are to be consolidated and operated under a service-at-cost franchise with city supervision, preparations are being made for the change. The franchise as adopted by the city provides for a supervisor of public utilities appointed by the Mayor. A. C. Scott, C. H. Chamberlain, Sloan Simpson and James M. Terrell have applied to the Mayor for the appointment.

## New Interurban Line for Ohio

### Electric Line Between Youngstown and Niles to Be Constructed at Once

Construction of a new interurban electric railway between Youngstown and Niles will be begun immediately by the Youngstown & Niles Railway. The contract for building the line, which will be 7½ miles in length, has been let to the Republic Railway & Light Company, Engineering Department, and this company has given sub-contracts to J W. Garland, Inc., for the grading, and to the S. R. Smyth Company, Inc., Pittsburgh, Pa. for the bridge and culvert work.

The line will be built on private right-of-way throughout and will traverse the center of the new town of McDonald, which is being built by the Carnegie Steel Company. The private way is of double-track width throughout, but the line will be single track at first with the one-track laid in double-track position so that the road may be double-tracked in part or throughout as the traffic demands.

The road will connect both in Youngstown and in Niles with the lines of the Mahoning & Shenango Railway & Light Company, which will operate the new line, supplying both equipment and power. Power will be fed in at both the Youngstown and Niles ends of the lines. Eighty-pound A. S. C. E. T-rail will be laid on oak ties with slag ballast. The overhead work will be of the bracket type carried on cedar poles and 4/0 trolley wire will be used. Track circuit block signals will be installed, each block being approximately 1 mile long.

The operating officials of the Mahoning & Shenango Railway & Light Company, which will operate the new line, are R. P. Stevens, president; R. T. Sullivan, general manager, and R. N. Graham, manager of railways.

## Increase in Wages in San Francisco

The United Railroads, San Francisco, Cal., recently announced an increase in the wages of its platform men beginning July 1. The motormen and conductors are to have an increase of 1 and 2 cents an hour as follows:

| Duration of Service | Present Pay Per Hour | Future Pay Per Hour |
|---|---|---|
| First six months | 27 cents | 29 cents |
| Second six months | 28 cents | 30 cents |
| Second year | 29 cents | 30 cents |
| Third year | 30 cents | 31 cents |
| Fourth year | 31 cents | 32 cents |
| Fifth year | 32 cents | 33 cents |
| Sixth year | 33 cents | 34 cents |
| Seventh year | 34 cents | 35 cents |
| Eighth year | 35 cents | 36 cents |
| Ninth year and over | 36 cents | 37 cents |

**Schenectady Labor Matters Settled.**—It has been agreed in conference between officials of the Schenectady (N. Y.) Railway and the representatives of the employees that overtime work in all branches of the service will hereafter be paid for at the rate of time and a half. Nine hours will constitute a day's work.

**Increase in Wages in Tampa.**—An increase of 2 cents an hour was made on July 1 in the pay of all motormen and conductors employed by the Tampa (Fla.) Electric Company. The reason for the increase is the increasing cost of the necessities of life, according to the announcement of the company. The present scale of wages is from 21 to 28 cents an hour, according to class of service and length of time employed. The new wage scale is from 23 to 30 cents an hour.

**Battery Car Operation Considered.**—L. J. Cooper, president of the Waycross Savings & Trust Company, Waycross, Ga., who purchased the property of the Waycross Street & Suburban Railway under foreclosure recently, hopes to continue to operate the line. The company bought power in the past. It has been suggested now that the line be converted for storage battery car operation, the local power company having agreed to charge only 1 cent per kw.-hr. for energy after 11 p. m.

**Pittsburgh Experts Named.**—The Council of Pittsburgh, Pa., has affirmed resolutions providing for the retention of experts in connection with the contests of the city with the Pittsburgh Railways, Duquesne Light Company, Equitable Gas Company and other concerns. The following engineers will be engaged: For the electric railway investigation, Bion J. Arnold and staff of Chicago; for light rate investigation, F. W. Ballard & Company, Cleveland; C. W. Pike, Philadelphia; E. M. Bemis, Chicago, and W. E. Reed, Pittsburgh; for gas cases, Mr. Bemis.

**Increase in Wages in Washington.**—The Washington Railway & Electric Company, Washington, D. C., has increased the wages of its motormen and conductors 2 cents an hour. The official announcement as posted by the company on July 1 was as follows: "The company has adopted an increased wage scale for motormen and conductors to become effective July 4, as follows: Less than one year, 26 cents an hour; second year, 27 cents an hour; third year, 28 cents an hour; fourth and fifth years, 29 cents an hour; sixth and seventh years, 30 cents an hour; eighth, ninth and tenth years, 31 cents an hour; more than ten years, 32 cents an hour."

**Hearing on New Philadelphia Applications on Aug. 2.**—Transit Director Twining of Philadelphia, Pa., was informed recently by the Public Service Commission that a hearing would be held on Aug. 2 on the applications of the city for authority to construct the Chestnut Street subway. The commission announced the date of the hearing immediately after receiving from Mr. Twining the requests and the plans and specifications which accompanied them. The applications were made in accordance with the new transit program which the Mayor decided upon, following the defeat of the Salus bill in the Legislature.

**Missouri Road to Be Sold.**—It is stated that the Southern Traction System, extending from St. Louis to Belleville, Ill., and points south, which never has been operated, will probably be sold to the Michigan Central Railroad. The road originally was intended for passenger and freight service. but was thrown into the hands of receivers shortly after the tracks were laid. The property could be used by the Michigan Central Railroad to transport coal from the Murphy, Lattmann-Reeb, New National, Schramm and White Rose mines to St. Louis and northern Illinois points.

**Tentative Wage Schedule for Providence.**—It is understood that the Rhode Island Company and the union officials have tentatively agreed upon a new wage schedule under which platform men will receive a maximum of 34½ cents an hour with a minimum guarantee of 6½ hours. This is an increase of 4½ cents an hour. In addition, the guarantee of a minimum is new, the company having refused any guarantee in the last agreement. The conferences between the two sides are said to be rapidly drawing to a close, and it is believed that the union will call a meeting soon to receive the report of its representatives.

**Conditions for Suspending Service in Lincoln.**—In connection with the plan to municipalize the railway at Lincoln, Ill., referred to in the ELECTRIC RAILWAY JOURNAL of July 7, page 32, it was stated that "the property lost money as a private venture and after disagreement with the Council of Lincoln the State Public Utilities Commission authorized the company to suspend operations." This statement was correct only in part, as the order of the commission in this case was to the effect that the company could discontinue operation upon receiving the consent of the duly authorized representatives of the city of Lincoln.

**Milwaukee Electric Divisions to Consolidate.**—According to reports, the two electric divisions of the Chicago, Milwaukee & St. Paul Railway are to be consolidated into one division, with Deer Lodge, Mont., as division headquarters. The territory extends from Avery, Idaho, on the west to Harlowton on the east. The division will be under the superintendency of J. J. Murphy, Deer Lodge. At present, Three Forks, Mont., is the headquarters of the eastern division and Missoula, Mont., of the western division. E. H. Barrett, assistant general superintendent of the road, states the move is being made as a matter of economy and will result in better operation of the road.

**City Sues Railway for Part of Bridge Costs.**—The City Council of Seattle, Wash., recently passed a resolution concurring in the action of Mayor H. C. Gill instructing Corporation Counsel Hugh M. Caldwell to bring suit against the Puget Sound Traction, Light & Power Company for $60,917, the company's share of the cost of construction of the Fremont Bridge across the Lake Washington government canal recently thrown open for use. Corporation Counsel Caldwell has also been instructed to compel the company to pay $133 per month as its share of the maintenance and operation cost of the bridge, and to buy from the city at the rate of 1 cent per kw.-hr. the current used by the cars in crossing the bridge.

**Court Sustains City Demurrers.**—In a memorandum decision rendered by Judge J. T. Ronald of the King County Superior Court at Seattle, Wash., recently, he sustained demurrers by Corporation Counsel Hugh M. Caldwell to two defenses of the Puget Sound Traction, Light & Power Company against the payment to the city of Seattle of 2 per cent of the gross earnings of the company during 1916. The city sued the company for $64,876, said to represent 2 per cent of the gross earnings during that year. The company refused to pay it on two grounds, first, the passage by the Public Service Commission of a law stating that it is against public policy to regulate the company, and, second, the passage of an ordinance compelling the company to sell commutation tickets on the cars, causing the company to lose the sum of approximately $70,000.

**Baltimore Holds Out for Pennsylvania Electrification.**—City Solicitor Field has submitted to the Board of Estimate of Baltimore, Md., the administration amendments to the Pennsylvania Railroad ordinances providing for terminal changes in that city. The amendments are regarded as the minimum that the city will accept for the franchises that the railroad company desires from the city, which include the building of new tunnels so as to give the company a four-track line through Baltimore and extensive freight-yard facilities in the heart of the city. As originally drawn the ordinances contained conditions which the railroad thought to be reasonable. The amendments contain what the Board of Estimate think the city and the public ought to have. One of the most important things demanded by the amendments is the electrification of the tunnels and terminals of the company in the city within three years after the war with Germany shall have ended.

**Railway Opposed to Busses.**—The Public Service Commission for the First District of New York has voted unanimously to dismiss the application of the Fifth Avenue Coach Company for permission to continue temporary operation of its motor buses from 135th Street north to Broadway and 169th Street, on the ground that the action of the Board of Estimate and Apportionment was not such as would enable the commission legally to approve the application. The Board of Estimate granted temporary permission to operate and the last permit extends the privilege until Oct. 15. The commission holds to the view that the form of temporary consent is not such as would enable it to grant its approval under Section 53 of the Public Service Commissions law, governing related matters. The decision, however, does not stop the operation. The company may continue the service until stopped by court proceedings. The Third Avenue Railway is opposed to the service of the bus company being continued, but no statement has been made as to whether or not it will appeal to the courts.

**Stenographers Needed by the Government.**—The United States Government needs both men and women stenographers and typewriters for service in the departments at Washington, D. C., and in Federal offices outside of Washington. The supply of qualified persons on the lists of the United States Civil Service Commission, Washington, D. C., of which John A. McIlhenny is president, for this class of work is not anything like equal to the demand, and the commission urges as a patriotic duty that citizens with this special knowledge apply for examination for the government service. At present all who pass the examination for the departmental service are certified for appointment. Examination papers are rated without delay. Examinations for the departmental service in Washington, D. C., for both men and women, are held every Tuesday in 400 of the principal cities. Examinations for positions outside of Washington, D. C., are held frequently. The usual entrance salary ranges from $900 to $1,200 a year. Advancement of capable employees is reasonably rapid. Applicants must have reached their eighteenth birthday on the date of the examination. Full information and application blanks will be mailed to persons interested upon application to the United States Civil Service Commission, Washington, D. C.

# Program of Association Meeting

## New England Street Railway Club

The annual men's outing of the New England Street Railway Club will be held at Portland, Me., on July 26, 27 and 28. The members of the club will be entertained as the guests of the Cumberland County Power & Light Company. The committee in charge includes Messrs. Hale, Brush, Belling, Gordon and McCray. It is proposed to leave Boston on the Eastern Steamship Company's boat from the Central Wharf, Atlantic Avenue, on July 26 at 6 p. m., arriving in Portland at 4.30 a. m. on July 27. At 7 a. m. cars of the Cumberland County Power & Light Company will take the party to Riverton Park for breakfast. After breakfast a ball game is proposed for the prize of a silver-mounted bat last won by Captain Hale's sluggers. It is also proposed to take those who desire to play golf to the country club, returning at noon. A special golf prize will be offered. In the meantime there will be a performance at the theater. In this will be included a few acts by club talent. At 12 o'clock, after a short ride around the city, the party will be taken to Cape Cottage, where dinner will be served at the casino. Following the dinner a steamer will take the members of the party for a ride around Portland Harbor. At 7.30 p. m. the return trip to Boston will be begun by boat. The rates by steamer from Boston to Portland are $1 and $1.50 for inside rooms and $2 and $3 for outside rooms. The official notice of the meeting requested that reservations for tickets and staterooms on boats between Boston and Portland be in the hands of the outing committee by July 20 at the latest.

# Financial and Corporate

## Regulation of Industry in War

### Owing to Existence of Regulation in Utility Field, No Sudden or Drastic Readjustment Is Expected

An optimistic view of the effect of prospective increased government regulation of industries resultant upon war conditions in so far as it might bear on public utilities is taken by L. P. Hammond, Bonbright & Company, New York, N. Y. In a recent statement Mr. Hammond said, in part:

"If it becomes necessary for our government to regulate our industries, the question facing the investor, of course, is whether the procedure will involve any radical readjustment of the business situation, particularly with respect to earnings. Under these circumstances, the investor in public utility securities finds great satisfaction in the fact that the industry is and for some time has been upon a regulated basis.

"The public utility corporations have themselves learned a great deal from the commissions, and correspondingly the commissions have learned a great deal from the corporations. There is no longer any mystery about the affairs of a public utility corporation. Nor does there exist on the part of governmental authority ignorance of the affairs of public utility corporations, with consequent danger of drastic and radical legislation hastily designed in misapprehension of true conditions and in suspicion of the good faith of the corporations.

"The holder of public utility securities can therefore look forward confidently to the future. He can rest assured that no sudden or drastic readjustment of corporate activities of the utility will ensue from regulation of its affairs. He knows that the methods of valuation which have finally been worked out are generally fair alike to the utilities and to the communities served. He knows that in most cases earnings are those which have been found sufficient to pay the necessary operating expenses of the utility, to provide for the maintenance of its physical property intact and in good operating condition, and to afford—all things considered—a fair return upon the fair value of the property.

"He is assured that the industry will not be subjected to unwise or unfair regulations and practices through the inexperience or prejudices of those who undertake its regulation, since the existing regulation is the result of deliberate, intelligent action based upon the experience of many years and governed by a mass of commission and court precedents flowing out of carefully considered contest and argument."

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## Railway Wins Earnings Tax Case

The State Supreme Court of Washington at Olympia on June 20 affirmed the decision of Judge Frater of the King County Superior Court holding that the city of Seattle was not entitled to collect a 2 per cent gross earning tax from the Seattle, Renton & Southern Railway, subsequent to the passage of the ordinance revoking the company's franchise. The suit was entitled "William R. Crawford vs. the Seattle, Renton & Southern Railway." Mr. Crawford was the plaintiff in the action for a receiver in 1912.

Hugh M. Caldwell, corporation counsel, states that this is the only matter not settled in the agreement reached recently between the city and the Seattle, Renton & Southern Railway, and that this was not taken up because it was on appeal at the time. Mr. Caldwell said the company had renewed payments after the court had held that the city could not revoke the franchise. He expressed the opinion that there was nothing in the decision that would have any bearing upon the difference between the city of Seattle and the Puget Sound Traction, Light & Power Company, which is suing to be relieved of paying a 2 per cent gross earning tax. Mr. Crawford states that the question at issue was merely whether the city could collect a percentage of the gross earnings of the company under a provision of a franchise which it was contended was invalid.

# Annual Reports

## Denver Tramway System

The comparative consolidated income statement of the Denver (Col.) Tramway System for the years ended Dec. 31, 1915 and 1916, follows:

| | 1916 | | 1915 | |
|---|---|---|---|---|
| | Amount | Per Cent | Amount | Per Cent |
| Gross earnings | $3,275,876 | 100.0 | $3,141,906 | 100.0 |
| Operating expenses (including partial depreciation): | | | | |
| Maintenance | $317,301 | 9.7 | $366,157 | 11.7 |
| Operation | 1,026,268 | 31.3 | 995,054 | 31.7 |
| General | 271,206 | 8.3 | 255,240 | 8.1 |
| Total | $1,614,775 | 49.3 | $1,616,451 | 51.5 |
| Net earnings | $1,661,101 | 50.7 | $1,525,455 | 48.5 |
| Taxes and franchise payments | 276,440 | 8.4 | 280,731 | 8.9 |
| Operating income | $1,384,661 | 42.3 | $1,244,724 | 39.6 |
| Other income | 21,233 | 0.6 | 22,709 | 0.7 |
| Gross income | $1,405,894 | 42.9 | $1,267,433 | 40.3 |
| Deductions from income: | | | | |
| Interest on funded debt | $980,488 | 29.9 | $992,253 | 31.6 |
| Interest on notes and accounts payable | 674 | 0.0 | 929 | 0.0 |
| Total | $981,162 | 29.9 | $993,182 | 31.6 |
| Net income | $424,733 | 13.0 | $274,251 | 8.7 |

The gross earnings of the system in 1916 showed an increase of $133,970 or 4.26 per cent. In the opinion of the management, this, together with the largely improved business conditions in Denver and in Colorado, would justify optimistic expectations of continued increase of tramway revenues, unless the exigencies of the international situation should exert adverse influence.

Despite the increase of business, operating expenses decreased $1,675. This, it is said, was accomplished through the introduction of some practical scientific management methods resulting in more efficient and more economical operation. The operating expenses increased $31,214 or 3.1 per cent, and the general expenses $15,966 or 6.2 per cent, while maintenance expenses decreased $48,856 or 13.3 per cent.

As a result of the increased revenues and decreased operating expenses, the net earnings gained $135,646 or 8.8 per cent. Taxes and franchise payments also decreased, as well as interest charges, so that the net income showed an increase of $150,482 or almost 55 per cent. The surplus as of Dec. 31, 1916, amounted to $761,123, as compared to a surplus figure of $387,999 shown at the close of the preceding calendar year.

No dividends have been paid since June, 1915. In 1916 the bonded indebtedness of the company was reduced $267,650 by sinking funds and maturities. During the year the expenditures for betterments aggregated $156,195. The increase of 1 cent an hour granted to employees of the transportation and mechanical departments, effective on Jan. 1, 1917, will mean the expenditure by the company of $25,000 a year.

The following table presents some miscellaneous statistics for passenger traffic and earnings on the city and the interurban lines of the system:

| | 1916 | 1915 |
|---|---|---|
| Passengers carried: | | |
| City lines | 75,133,046 | 72,222,850 |
| Interurban lines | 1,065,451 | 900,395 |
| Total | 76,198,497 | 73,123,245 |
| Passenger earnings per car mile (cents): | | |
| City lines | 25.86 | 25.61 |
| Interurban lines | 29.30 | 27.28 |
| Passenger earnings per car hour: | | |
| City lines | $2.49 | $2.42 |
| Interurban lines | 4.89 | 4.47 |
| Car miles operated, passenger: | | |
| City lines | 11,427,964 | 11,125,869 |
| Interurban lines | 389,726 | 366,970 |
| Total | 11,817,690 | 11,492,839 |
| Car hours operated, passenger: | | |
| City lines | 1,184,588.2 | 1,175,853.6 |
| Interurban lines | 23,351.2 | 22,393.8 |
| Total | 1,207,939.4 | 1,198,247.4 |

### Illinois Traction System

The comparative income statement of the Illinois Traction System, Peoria, Ill., for the calendar years 1915 and 1916 follows:

| | 1916 | | 1915 | |
|---|---|---|---|---|
| | Amount | Per Cent | Amount | Per Cent |
| Interurban lines | $3,993,836 | 31.8 | $3,559,028 | 31.8 |
| City lines | 3,110,811 | 24.7 | 2,871,035 | 25.6 |
| Gas | 923,642 | 7.4 | 905,702 | 8.0 |
| Electric | 3,689,851 | 29.4 | 3,325,410 | 29.7 |
| Heat | 341,379 | 2.7 | 317,579 | 3.8 |
| Water | 14,476 | 0.1 | 14,215 | 0.1 |
| Miscellaneous | 492,450 | 3.9 | 195,022 | 1.7 |
| Total gross earnings | $12,566,447 | 100.0 | $11,187,994 | 100.0 |
| Operating expenses and taxes | 7,489,797 | 59.6 | 6,657,569 | 59.5 |
| Gross income | $5,076,649 | 40.4 | $4,530,425 | 40.5 |
| Interest on bonds | 3,603,417 | 28.7 | 3,268,607 | 29.2 |
| Net income available for depreciation, dividends, etc. | $1,473,232 | 11.7 | $1,261,818 | 11.3 |

According to the annual report, the gross and the net earnings from all departments showed normal increases. The main increases in gross were $444,808 or 12.5 per cent for the interurban lines, $239,776 or 8.4 per cent for the city lines and $364,441 or 10.9 per cent for the electric department. The total gross earnings gained $1,378,453 or 12.2 per cent.

The report does not give any details of operating expenses, which as a whole increased $832,228 or 12.5 per cent. The gross income increased $546,224 or 12.0 per cent, but this gain was cut into by the rise of $334,810 or 10.2 per cent in interest charges. The net result was an increase of $211,414 or 16.7 per cent in net income. After deducting $505,565 for depreciation and $65,282 for bond discount, the company had a surplus of $902,384 for the year.

This result from operation, it is said, was especially gratifying because of the extraordinarily high prices which prevailed throughout the year on substantially all materials. In particular the supplying of fuel for the electric generating stations was a matter of concern. Moreover, all skilled and common labor demanded constantly increasing wages, and it was advisable in some instances to meet this condition in order that the company's permanent organization should not become disrupted. These deterrent influences, however, were partly offset by the operating efficiency and persistent solicitation for new business.

The activity in industrial lines as the result of an abnormal demand for manufactured products at home and abroad contributed to a condition of prosperity in the territory served by the company which had a direct bearing on the gross earnings, especially from transportation and electric power. The street railways benefited from nearly the total disappearance of "jitney" competition and the fact that the effect of privately owned automobiles is not so apparent, although still a considerable detriment.

During the last year new freight equipment for the interurban lines was ordered, as follows: 100 box cars, 80,000 lb. capacity; 60 hopper bottom cars, 100,000 lb. capacity, and 40 flat-bottom gondola cars, 80,000 lb. capacity. Enlargement and extensions of the facilities for handling interurban freight traffic were effected, new connections with grain elevators, manufacturing industries and coal mines were completed, and working agreements were entered into with additional steam railroads.

## Extension of Organization for Selling Securities to Consumers

The bond department of Henry L. Doherty & Company, New York, N. Y., has opened a branch office in Toledo, in charge of Walter J. Young, formerly power salesman of the new-business department of the Toledo Railways & Light Company. This new office is the third step in a comprehensive plan for selling securities to consumers of Doherty service. The plan was inaugurated at Massillon, Ohio, in 1914, by the sale of the preferred stock of the Massillon Electric & Gas Company to the public. Last February a more elaborate campaign was carried on in Denver, where the firm of Barker & Smith was organized to deal in the securities of companies operated by H. L. Doherty & Company. The bond department hopes, in time, to have either a special representative in every Doherty community, or to conduct an organized security selling campaign under the direction of the local general manager.

**American Water Works & Electric Company, New York, N. Y.**—The stockholders of the American Water Works & Electric Company have voted to increase the capital stock of the company from $25,000,000 to $30,000,000. The additional capitalization is to be issued in the form of first preferred stock and will increase the amount of that issue from $5,000,000 to $10,000,000. It is proposed to fund the 21 per cent accumulated dividends on the present outstanding issue. The plan to liquidate the dividend is as follows: $150,000 or 3 per cent, in cash forthwith; $450,000 or 9 per cent, in first preferred stock at par, and $450,000 or 9 per cent in common stock at 22½, or $2,000,000 par value of common stock.

**Boise (Idaho) Railroad, Ltd.**—The Boise Railroad, consisting of city lines and the Natatorium, a famous natural hot-water resort, were bid in recently in the Federal Court by David Miller and W. E. Pierce for $100,000. Judge Frank S. Dietrich of the federal court has confirmed the sale. H. E. Dalton, former manager, conducted the sale as receiver. Only one other bid was offered, that of J. W. Cunningham for $60,000. The sale was brought about on account of foreclosure proceedings instituted by the Germantown (Pa.) Trust Company.

**Calgary (Alta.) Municipal Railway.**—Thomas H. McCauley, superintendent of the Calgary Municipal Railway, recently wrote A. G. Graves, street railway commissioner of the city, that the line would face a deficit of $22,000 on July 1. Mr. McCauley said: "I beg to submit to you herewith reports covering April, and four months to April 30, showing a deficit of $16,741, to which must be added that of May, estimated at $2,500; uniforms and caps, $3,550. so that I estimate we will face a deficit of $22,000 July 1. A portion of this amount is made up of materials for the year's operations, car wheels, air brakes, electrical equipment for repairs, and stock that had to be purchased for replacements at very much increased cost, also car reconstruction expenses. From the daily reports you will notice that we are still operating 250 car hours per day, with two men, or 74 cents an hour. One man on these cars would save $60 a day. By July 15 I will have fully equipped with all safety devices cars sufficient to operate the lines, and would recommend that same be approved that, if possible, we may recover the losses before the end of the year."

**Cape May, Delaware Bay & Sewell's Point Railway, Cape May, N. J.**—The West Jersey & Seashore Railroad and the Atlantic City & Shore Railroad are said to have presented to the New Jersey Board of Public Utilities Commissioners a joint proposal to operate the Delaware Bay & Sewell's Point Railway at Cape May to help the government in the construction of the naval base there. The road was sold in the spring under foreclosure to Wilson & Carr, attorneys of Camden, for $55,000, and is said to have been disposed of since by them to the Walker-James Company, which contemplated dismantling the property.

**Carolina Power & Light Company, Raleigh, N. C.**—Warner, Tucker & Company, Boston, Mass., announce that there has become effective a plan calling for the exchange of the preferred and common stocks of the Carolina Gas & Electric Company for the common and preferred stocks of the Carolina Power & Light Company. The holdings of stock, constituting more than a majority in interest, of Warner, Tucker & Company and associates will be so exchanged, and the minority holders of Carolina Gas & Electric Company are to be accorded the same privilege. With the exchange of stock the control of the Carolina Gas & Electric Company is to be acquired by the Yadkin River Power Company, a subsidiary of the Carolina Power & Light Company, which does a general lighting, power and gas business and operates 13.65 miles of electric railway.

**Charlottesville & Albemarle Railway, Charlottesville, Va.**—The Charlottesville & Albemarle Railway has recently paid a semi-annual dividend of 3½ per cent on its preferred stock and a 2½ per cent semi-annual dividend on its common stock.

**Cincinnati (Ohio) Traction Company.**—An application has been filed with the Ohio Public Utilities Commission by the Cincinnati Traction Company for permission to purchase 100 double-truck, steel, pay-within cars, and to pay for them with $550,000 of 6 per cent equipment trust certificates, the remainder to be paid in cash.

**Jefferson County Traction Company, Beaumont, Tex.**—The taxpayers of Port Arthur and Beaumont have authorized by referendum vote the merging of the properties of the Jefferson County Traction Company, the Beaumont Traction Company, the Beaumont Electric Light & Power Company and the Port Arthur Light & Power Company, all controlled by the Eastern Texas Electric Company, a Stone & Webster property. The merger is in the interest of intercorporate simplicity.

**Kentucky Securities Corporation, Lexington, Ky.**—The holders of the common and the preferred stocks of the Kentucky Securities Corporation have the right to subscribe to 8.2 per cent of their holdings in new preferred stock of the corporation. The subscription price of the new preferred stock has been fixed at 82½ per cent of par value, plus accrued dividend at rate of 6 per cent from July 1, 1917. Payment is to be made at the Philadelphia offices in full on or before Aug. 15 or on a partial payment plan.

**Mahoning & Shenango Railway & Light Company, Youngstown, Ohio.**—The Ohio Public Utilities Commission issued a formal order on July 12, approving the merger of the Youngstown & Sharon Railway, the Mahoning Valley Railway, the Youngstown Park & Falls Railway, the Poland Street Railway and the Mahoning Valley Southeastern Railway with the Mahoning & Shenango Railway & Light Company in the interest of economy and centralized management.

**New York (N. Y.) Railways.**—The stockholders of the Bleecker Street & Fulton Ferry Railroad, which has been taken over by the New York Railways, will vote on July 25 on a declaration of abandonment of routes adopted by the directors on June 8 last.

**Ohio Electric Railway, Cincinnati, Ohio.**—The Ohio Public Utilities Commission has approved the application of the Ohio Electric Railway for authority to purchase rolling stock equipment to the value of $130,000, paying therefor in cash $30,000 and issuing $100,000 of equipment trust certificates to secure the rest of the funds. The company contemplates the purchase of four motor express cars, sixteen flat trail cars and sixteen box trail cars.

**Orleans-Kenner Electric Railway, New Orleans, La.**—Leigh Carroll has been appointed receiver of the Orleans-Kenner Electric Railway as a result of the application made by J. D. Purcell, trustee, representing certain of the security holders. The affairs of the company have been reviewed briefly several times recently in the ELECTRIC RAILWAY JOURNAL. The receivership proceedings are understood to have been of a friendly nature and are said to have been decided upon as offering perhaps the best means to a speedy and satisfactory readjustment of the affairs of the company.

**Philadelphia (Pa.) Rapid Transit Company.**—A semi-annual dividend of 2½ per cent, or $1.25 a share, has been declared out of the surplus earnings of the Philadelphia Rapid Transit Company for the fiscal year ended June 30 upon the capital stock of the company, payable on July 31 to shareholders of record of July 23. This is the second semi-annual dividend of the company, 2½ per cent having been paid in January, 1917. In October, 1916, $1 was paid on the stock, being the first disbursement since the company was formed in 1902.

**Quebec Railway, Light, Heat & Power Company, Quebec, Que.**—The Quebec Railway, Light, Heat & Power Company will be awarded $275,000 for property known as the Quebec Gas Company's land belonging to the Quebec Railway, which has been appropriated by the federal authorities, according to a decision of the Exchequer Court. The government offered the Quebec Railway some time ago $125,000, or at the rate of $2 per foot for the land, but the court made the award $5 a foot, or $270,000. To this is added $30,000 already decided upon by mutual agreement, as a sort of bonus, which makes a total of $305,000. The crown also will have to pay the cost of the proceedings.

**San Antonio (Tex.) Public Service Company.**—The San Antonio Public Service Company has been incorporated in Texas with a capital stock of $4,700,000 for the purpose of taking over and operating the properties of the San Antonio Gas & Electric Company and the San Antonio Traction Company, both controlled by the American Light & Traction Company. The new company is also authorized in its charter to construct a system of interurban electric railways out of San Antonio, and it is reported will build a line between San Antonio and Austin, a distance of about 85 miles. The San Antonio & Austin Traction Company has been promoting the construction of this proposed road for some time past. The San Antonio Public Service Company is headed by Emerson McMillin, New York, who is chairman of the board of directors of the American Light & Traction Company.

**Toledo Traction, Light & Power Company, Toledo, Ohio.**—Harris, Forbes & Company, New York, N. Y., Harris, Forbes & Company, Inc., Boston, Mass., and the Harris Trust & Savings Bank, Chicago, Ill., have sold at 100 and interest a block of $486,000 of first lien 6 per cent five-year bonds of 1913 of the Toledo Traction, Light & Power Company, making the total outstanding of this issue $7,499,000.

## Dividends Declared

Bangor Railway & Electric Company, Bangor, Me., quarterly, one-half of 1 per cent, common.

Carolina Power & Light Company, Raleigh, N. C., quarterly, one-half of 1 per cent, common.

East St. Louis & Suburban Company, East St. Louis, Ill., quarterly three-fourths of 1 per cent, preferred.

Milwaukee Electric Railway & Light Company, Milwaukee, Wis., quarterly, 1½ per cent, preferred.

New Hampshire Electric Railways, Haverhill, Mass., 1 per cent, preferred.

Public Service Investment Company, Boston, Mass., quarterly, 1½ per cent, preferred.

Trinidad Electric Company, Ltd., Port-of-Spain, Trinidad, quarterly, 1¼ per cent.

## Electric Railway Monthly Earnings

| Period | | Operating Revenue | Operating Expenses | Operating Income | Fixed Charges | Net Income |
|---|---|---|---|---|---|---|
| ATLANTIC SHORE RAILWAY, SANFORD, ME. | | | | | | |
| 1m., June, | '17 | $16,495 | $11,634 | $4,861 | $430 | $4,431 |
| 1 " " | '16 | 28,422 | 26,571 | 1,851 | 650 | 1,200 |
| BATON ROUGE (LA.) ELECTRIC COMPANY | | | | | | |
| 1m., May, | '17 | $17,792 | *$10,383 | $7,409 | $3,498 | $3,911 |
| 1 " " | '16 | 17,765 | *8,267 | 9,498 | 3,469 | 6,029 |
| 12 " " | '17 | 221,329 | *106,159 | 115,170 | 42,274 | 72,896 |
| 12 " " | '16 | 201,669 | *105,681 | 95,988 | 33,610 | 62,378 |
| BROCKTON & PLYMOUTH STREET RAILWAY, PLYMOUTH, MASS. | | | | | | |
| 1m., May, | '17 | $9,586 | *$10,916 | †$1,330 | $1,222 | †$2,552 |
| 1 " " | '16 | 10,076 | *9,663 | 413 | 1,101 | †688 |
| 12 " " | '17 | 125,193 | *116,962 | 8,231 | 13,653 | †5,422 |
| 12 " " | '16 | 118,566 | *99,623 | 18,943 | 13,338 | 5,605 |
| CAPE BRETON ELECTRIC COMPANY, LTD., SYDNEY, N. S. | | | | | | |
| 1m., May, | '17 | $36,029 | *$25,167 | $10,862 | $6,683 | $4,179 |
| 1 " " | '16 | 30,278 | *20,036 | 10,242 | 6,548 | 3,694 |
| 12 " " | '17 | 419,412 | *245,679 | 173,733 | 78,741 | 94,992 |
| 12 " " | '16 | 378,587 | *222,213 | 156,374 | 78,654 | 77,720 |
| CLEVELAND, PAINESVILLE & EASTERN RAILROAD, CLEVELAND, OHIO. | | | | | | |
| 1m., May, | '17 | $43,746 | *$29,011 | $14,735 | $12,176 | $2,559 |
| 1 " " | '16 | 39,296 | *22,451 | 16,845 | 12,074 | 4,770 |
| 5 " " | '17 | 195,889 | *120,928 | 74,961 | 58,953 | 16,008 |
| 5 " " | '16 | 167,088 | *99,043 | 68,045 | 56,695 | 11,850 |
| COLUMBUS (GA.) ELECTRIC COMPANY | | | | | | |
| 1m., May, | '17 | $84,410 | *$33,300 | $51,110 | $28,444 | $22,866 |
| 1 " " | '16 | 66,694 | *28,710 | 37,984 | 28,647 | 9,337 |
| 12 " " | '17 | 973,048 | *369,711 | 603,337 | 341,975 | 261,362 |
| 12 " " | '16 | 771,037 | *331,591 | 439,496 | 344,173 | 95,323 |
| DALLAS (TEX.) ELECTRIC COMPANY | | | | | | |
| 1m., May, | '17 | $170,225 | *$109,371 | $60,854 | $41,262 | $19,592 |
| 1 " " | '16 | 151,437 | *100,925 | 50,512 | 36,695 | ‡15,817 |
| 12 " " | '17 | 2,102,289 | *1,271,735 | 830,554 | 472,195 | ‡366,501 |
| 12 " " | '16 | 1,887,791 | *1,166,867 | 720,924 | 420,957 | ‡311,167 |
| EASTERN TEXAS ELECTRIC COMPANY, BEAUMONT, TEX. | | | | | | |
| 1m., May, | '17 | $74,232 | *$43,957 | $30,275 | $11,674 | ‡$20,333 |
| 1 " " | '16 | 65,334 | *36,738 | 28,596 | 8,870 | 19,726 |
| 12 " " | '17 | 883,414 | *477,162 | 406,252 | 115,991 | ‡293,491 |
| 12 " " | '16 | 781,095 | *407,974 | 373,121 | 105,923 | 267,198 |

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*Includes taxes. †Deficit. ‡Includes non-operating income.

# Traffic and Transportation

## Decision in Connecticut Service Case

### Public Utilities Commission Holds That Connecticut Company Should Not Be Required to Procure Any Specific Number of New Cars

The Public Utilities Commission of Connecticut on July 3 handed down its decision in the matter of the inquiry by it into the question of the adequacy of the service of the Connecticut Company. The commission is of the opinion that no order should issue at this time requiring the company to procure any specific number of passenger cars. It says, however, that the absence of a positive order is not intended to relieve the company from its obligations to furnish adequate service nor from the exercise and mandate of good judgment to anticipate future traffic needs and reasonably to provide for the same. This decision by the commission was reached after consideration of the facts that were brought out at the hearings in the case, including the information filed by the company in answer to inquiries made of it by the commission, and having in mind the present unsettled industrial conditions and the effect of these conditions upon electric railway requirements.

#### INDEPENDENT INQUIRY BY COMMISSION

Under date of March 6 the commission sent a letter to the company in which it said it had noted that the service of the company had been unsatisfactory. The commission attempted on its own initiative through conferences with representatives of the company and the traveling public and by independent investigations to discover the underlying causes of the alleged unsatisfactory service and to assist in remedying such of these cases as were manifest. The commission concluded after the hearings that while inadequacy of track facilities in some places contributed largely to the defects in the service, the chief cause was a general shortage of cars. In its finding the commission referred to its inquiry during 1915 and 1916 and quoted the statement of L. S. Storrs, president of the company, on March 28, 1916, that in his opinion 100 to 150 new cars would take care of traffic during the winter of 1916-1917 unless extraordinary demands were experienced. On June 21, 1916, the commission approved plans for 100 new convertible type cars, delivery to be made on Oct. 1, 1916. None of these cars, however, were delivered before Feb. 1, 1917, and only four were received by the company prior to March 1, 1917.

The commission expressed the conclusion that adequate service could be secured only by preparation made long in advance. In view of the foregoing the company was directed and required to appear before the commission on March 15 and show cause why an order should not issue directing it to procure additional cars. As a result of the hearing on March 15 the commission formulated a list of questions which it asked the company to answer before March 30, to which date the hearing was continued. The commission required the company among other things to furnish it with a list of passenger cars designated by operating divisions and giving the various types of cars. It also required a statement of the general service conditions of the passenger cars by divisions, an estimate of the number and kind of passenger cars expected to be retired from service from each division during 1917, the total number and kind of passenger cars retired from service in each division during each of the last three calendar years, an estimate of the number and kind of additional passenger cars necessary to render adequate service on each division during the coming summer and the winter of 1917 and 1918. It further required from the company a statement of the number of passengers carried on each division during each of the last five calendar years, the net average and total seating capacity of cars in service on each division during each of the last five calendar years, the latest available count of traffic during rush hours on certain of the lines, what the proposed distribution was of the 100 cars ordered in 1916 and a statement of the redistribution of the existing cars to the various lines of other divisions. It also asked about the power supply and the shop facilities.

#### COMPANY FILES WRITTEN REPLY

On March 30 Mr. Storrs, counsel, and the entire board of trustees of the company filed written answers to the questions and submitted a statement regarding the financial condition of the company and other matters relevant to the inquiry. It was the commission's original impression that the complaints regarding the service were based upon inadequacy of the company's rolling stock and that the remedy was the acquisition of more cars. The representatives of the company admitted overcrowding during the rush hour, but stated that this was due to the failure to receive on time the cars ordered in the spring of 1916 and promised for delivery in the fall of the same year. Traffic in 1916 ran far ahead of that for any of the five years preceding, and for 1917 had been materially greater than for the corresponding period of 1916. It was asserted at the hearing that in the company's opinion the peak of passenger traffic had been reached, and unless all indications should prove false there would be no increase in the immediate future beyond the year 1916, while a slight decrease could normally be expected.

#### DECREASE IN BUSINESS LIKELY

The commission expressed the opinion that the electric railway situation viewed in connection with the present war conditions may possibly bear out the company's conclusion that while the demands in certain localities will be somewhat increased, they will be at least proportionately decreased in other localities, and the net result will leave the requirements upon the company at no higher level than they have been for the past year. The commission considered that the important question was the adequacy of the company's equipment for handling winter traffic. It said that it was apparently adequately equipped to handle summer traffic. The commission concluded its findings in part as follows:

"The figures showing the increase in passengers carried in 1915-1916 are without question explained by the unusual conditions in the larger cities incident to the production of war materials. This sudden increase in business could not reasonably have been anticipated, and on account of the uncertainty of its continuance the company was reluctant immediately to acquire additional equipment, at constantly rising prices, in order to meet what might be only a temporary demand. There is a possible analogy between the conditions confronting the railway in this sudden state of industrial activity and the conditions existing universally in large cities during the rush-hour periods of the day. It is commonly conceded that no electric railway should be required to furnish seating accommodation for every passenger during such rush-hour periods in large industrial centers, because if this were done the company would be required to maintain a large amount of idle equipment during the portions of the day when traffic is lighter. For the same reason there may be some justice in excusing the company from at once acquiring sufficient equipment to give wholly satisfactory service during the period of unusual industrial activity because of the possibility that upon the cessation of the period of activity the company would have on its hands a surplus of equipment acquired at abnormal prices. The problem confronting the electric railway managers is to forecast the normal future demands upon transportation companies.

"The same conditions which are throwing an unusual burden upon the electric railways operate also to increase the cost of new equipment. The double-truck convertible pay-as-you-enter cars purchased by the Connectcut Company in 1915 are reported by that company to have cost approximately $5,575 each. Similar cars, according to estimates furnished by car builders, would now cost in the neighborhood of $8,700 each and the time of delivery would be very indefinite.

#### PRESENT EQUIPMENT PROBABLY ADEQUATE

"While conditions during the last winter in the larger cities were unsatisfactory, there is good reason to believe that the use during the coming winter of the 100 cars which are now being delivered will give material relief except in the unexpected event that the demands should be in excess of those during the past winter."

## Washington Jitney Men Win

### Secure an Injunction Against Their Prosecution by the Puget Sound Traction, Light & Power Company on Criminal Warrants

Judge J. T. Ronald in the King County Superior Court at Seattle, Wash., recently filed a memorandum decision granting the injunction sought by twenty-five jitney-bus drivers to restrain the officials and agents of the Puget Sound Traction, Light & Power Company from prosecuting them on criminal warrants charging violations of provisions of the State law requiring jitney-bus drivers to file bonds and procure permits from the Secretary of State for the operation of jitneys. Attorneys for the jitney men ask that the railway be restrained from prosecuting upon the grounds that the company had chosen a court of equity as its forum and should not be permitted to enter a criminal court at the same time.

In the original suit for a temporary injunction which was tried before Judge Ben Sheets of Grays Harbor County twenty-five defendants were named, but the company later came into court with an amended complaint increasing the number of defendants to 195. After Judge Sheets had refused to grant a temporary injunction, holding that the railway was not in need of immediate relief, the traction company dismissed its cause of action as to all of the defendants except the original twenty-five, on the ground that they had not been served with a copy of the complaint. The defendants who were dropped from the original cause, in the Superior Court, were afterward made defendants in an application for an injunction brought by the company in the federal court, and this case is now awaiting a decision by Judge Neterer, on a question of jurisdiction.

The basis of the decision appears to be that the railway, having elected to pursue the remedy of injunction, and having failed to obtain relief in a court of equity, it is now estopped from attempting to achieve the same end by criminal prosecution. Unless the other jitney drivers now charged with criminal violations are brought within the protection of Judge Ronald's decision their cases will be tried.

## Increase for Small Idaho Roads

The Public Utilities Commission of Idaho has denied the application of the large railroads operating in the State for a 15 per cent horizontal rate increase. The thirteen railroads operating in Idaho applied for the increase in rates and filed tariffs with the commission effective July 1. These tariffs the commission suspends as to most of the roads. It makes a few exceptions as to the smaller railroads where the evidence showed that on their receipts they were not paying operating and other expenses. They are the Caldwell Traction Company, Pacific & Idaho Northern, Lewiston, Nez Perce & Eastern, Camas Prairie and the Boise Valley Traction companies. The carriers denied the right to increase their rates are the Oregon Short Line Railway, Oregon-Washington Railroad & Navigation Company, Great Northern, Northern Pacific, Chicago, Milwaukee & St. Paul, Spokane & Inland Empire, Spokane International and the Ogden, Logan & Idaho.

In deciding against the larger carriers the commission says in its order and opinion:

"The commission feels that the world-wide phenomenon of rising prices is by this time no novelty. Since 1906 prices have been rapidly rising. This has mirrored itself in the increased cost of living. This advance in the price level must eventually be reckoned with in railroading. For a time its effect may be overcome by increases in the volume of traffic and economies practiced by the railroads. In justice to the petitioners in this case, we believe that there are some commodities that could rightly stand a reasonable increase without causing any hardship or injustice to the public. The railroads must be maintained at the highest possible standard of efficiency in order to take care of the demands made upon them. Many industrial enterprises are making enormous returns and unless railroad returns bear some reasonable relationship to the returns from these other enterprises, it will be very difficult to secure capital for railroad investment."

## Rate Question in Missouri

### Members of the Missouri Association of Public Utilities Being Canvassed in Regard to General Application to Missouri Commission for Relief

The Missouri Association of Public Utilities is considering the advisability of having its member companies apply to the Missouri Public Service Commission for permission to make a general rate increase. The rates committee of the association, of which Hugh Wurdeck, president of the Light & Development Company, St. Louis, is chairman, is asking members of the association for their views on the matter. It is understood that the majority of the gas, water and electric interests are in favor of an appeal to the commission for relief, but that the electric railways are undecided upon action on an application for increased fares. If the companies decide to go before the commission that body will probably be asked to grant the increase as an emergency measure, retaining the right to cancel the concession as soon as it is satisfied that there has been a return to conditions similar to those that existed before the war. Up to July 19 no general application had been made to the commission by any of the classes of utilities.

## Hearing on Baltimore Skip Stops

The skip-stop plan of operation having had more than two months' trial on two lines of the United Railways & Electric Company, Baltimore, Md., and the commission having received a number of communications relative thereto, including letters condemning as well as commending the system, it was decided by the commission to hold a hearing with a view to determining whether that body should sanction the continuance of the system and its extension to other lines. To lay a tangible foundation for a hearing the commission formulated a specific complaint against the railway, embodying an epitomization of all the charges against the skip-stop in the letters received from dissenters. In this formal complaint it is contended that the skip-stop is unjust and unreasonable and productive of inadequate service and creates a much larger measure of public inconvenience, discomfort and hardship than any it removes. The company's answer is about to be filed. The commission will then fix a date for a public hearing. Of the persons opposed to the skip-stop only a small percentage is antagonistic to the principle of operation. The others oppose the skipping of specific points. The hearing will be upon the general principle, but the commission may be expected to pass upon the reasonableness of the selection of skipped points by the company. The answer of the company to the commission's complaint will take issue with each contention made in that complaint, and will be supported by charts and statistics in substantiation of its position.

**Increase in Fare in Pennsylvania.**—The Cumberland Railway, Carlisle, Pa., operating between Carlisle, Mount Holly and Newville, has increased the fare from Carlisle to Mount Holly from 10 cents to 14 cents and from Carlisle to Newville from 20 cents to 28 cents.

**Increase in Zone Fares Authorized.**—The Board of Public Utility Commissioners of New Jersey has granted permission to the Northampton, Easton & Washington Traction Company, Easton, Pa., to add 1 cent to each of the seven zones on its line between Phillipsburg and Port Murray, N. J.

**Suburban Fare Case at Kansas City Closed.**—The arguments in the proceedings concerning suburban and interurban fares on Kansas City (Mo.) Railways were heard in Jefferson City, Mo., on July 12, by the Public Utilities Commission. Decision will probably not be rendered before September.

**Claim Adjuster Injured.**—While adjusting claims on July 11 due to a recent wreck on the road, Fred J. Zink, claim agent of the Toledo & Indiana Railroad, Toledo, Ohio, was seriously injured when the automobile in which he was riding was struck by a car on his own road. Attorney R. L. Starr, who was aiding him, and the Rev. J. A. Jayne, who was driving the automobile, were killed.

**Another Maine Road Increases Its Fares.**—In order to meet the rapidly increasing advances in operating expenses which all the electric railways throughout the country are now experiencing, the Lewiston, Augusta & Waterville Street Railway, Portland, Me., has raised the fare between Lewiston and Bath, a distance of 28.3 miles, from 35 cents to 50 cents, making ten 5-cent zones in the place of seven. The company has also discontinued the use of reduced rate tickets, formerly sold in strips of eleven for 50 cents. Both of these changes became effective on July 1.

**New Fare Tariff Filed.**—The Plattsburg (N. Y.) Traction Company has filed with the Public Service Commission for the Second District of New York the following tariff changes: Local fares for strip tickets good for six 5-cent rides, 25 cents; strip tickets good for ten 10-cent rides between Plattsburg and Bluff Point, 50 cents; and book tickets good for fifty 5-cent rides, $2; also fares for children five years of age and under twelve, 3 cents where 5-cent fare prevails and 6 cents where 10-cent fare prevails. The changes are to become effective on Aug. 1, 1917.

**California Commission to Investigate Jitneys.**—The Railroad Commission of California has instituted an investigation into rates, rules and regulations of the jitneys and auto truck lines subject to its jurisdiction. The first hearing will be held in Los Angeles before the commission en banc on July 25 and this will be followed by a hearing in San Francisco on Aug. 8. The purpose will be to secure information and suggestions from auto bus men and all interested parties upon which the commission may formulate rules for the regulation of these carriers. The rules will cover quality of service, schedules, filing of bonds, etc.

**Three Accidents in Ohio.**—There were three serious accidents during the week ended July 7 on the interurban electric railways in Ohio. Two of the accidents occurred on July 4. One caused the death of three persons, the result of a rear-end collision at night on the Toledo & Indiana Railway near Stryker. Another death resulted from an accident at Youngstown, when an interurban car entering the city left the track and struck a telephone pole. Fifteen others were injured in this accident. In a head-on collision between two cars on the Cleveland, Painesville & Eastern Railway at Stop 67 on July 5 eleven people were slightly injured.

**Independent Jitney Men in Portland Suspend Operation.**—The Portland Trackless Car Company recently filed acceptance with the City Council of Portland, Ore., of the four jitney franchises which were granted by the voters of that city at the recent municipal election. It is understood that Stephen Carver, head of the Portland Trackless Car Company, is preparing to operate lines of jitney buses prescribed in the franchises. Scores of independent jitney men are going out of business in Portland, since they have found it impossible to secure the $2,500 bonds made necessary by the ordinance which was passed by the voters at the election. Jitneys and "for hire" cars have until Aug. 1 to produce the $2,500 bond which each is required to deposit with the city under the jitney bonding ordinance. If the bond is not filed by Aug. 1 the license will be revoked. The bonding provision applies to all autos in the city which operate for hire.

**One Auto for Every Twenty-nine Persons.**—Iowa led the United States in 1916 in the number of motor cars registered in proportion to population. In that State there was one car for every eleven persons. California was a close second with one car to every twelve inhabitants. Nebraska and South Dakota had one for every thirteen. Arkansas could show but one for every 116. The average for the United States is one car for every twenty-nine persons, according to figures presented by the Office of Public Roads, United States Department of Agriculture, in Circular 73, "Automobile Registrations, Licenses and Revenues in the United States, 1916." The New England States were more uniformly supplied with motor cars than any other section. They averaged one car to about every twenty-seven persons. The prosperous corn belt states also showed a fairly uniform distribution of cars. The South, where the roads are not so good, had relatively fewer cars in proportion to population.

# Personal Mention

**E. L. Howell** has been made claim agent for the Salt Lake & Utah Railroad, Salt Lake City, Utah, to succeed E. H. Craddock.

**J. M. Pogue**, formerly assistant secretary and assistant treasurer of the Ohio Electric Railway, Springfield, Ohio, has been appointed purchasing agent of the company, succeeding George L. Mayer, resigned. Mr. Pogue has been with the company for many years.

**George L. Mayer**, purchasing agent of the Ohio Electric Railway, Springfield, Ohio, has resigned to take charge of the Chicago office of Joseph Joseph & Brothers Company, Cincinnati, Ohio, scrap dealers. Mr. Mayer has been with the Ohio Electric Railway as storekeeper and purchasing agent for more than ten years.

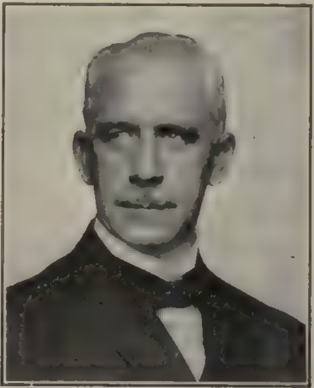
**R. J. Byrum**, office manager of the Wheeling (W. Va.) Traction Company, has resigned from the company to become connected with the contracting firm of R. L. Byrum & Sons, Wheeling. Mr. Byrum was connected with the company for twelve years and for two years had been principal assistant to George O. Nagle, formerly vice-president and general manager of the company.

**Clyde Taylor**, general counsel for the Kansas City (Mo.) Railways, has been elected vice-president of the company and will act as president during the absence of Col. P. J. Kealy, president of the company, at camp and in the war. Chester C. Smith, assistant to the president, will take Colonel Kealy's place on the board of control, and will perform certain other duties that formerly devolved upon the president. Colonel Kealy has been granted a leave of absence for an indefinite period, dating from July 14, 1917.

**William Kingdon**, for the last ten years assistant superintendent of the lines of the Connecticut Company at Stamford, has been promoted to the position of superintendent there to succeed J. B. Potter, who, as noted in the ELECTRIC RAILWAY JOURNAL for June 30, has become connected with Sanderson & Porter. Mr. Kingdon has been engaged in electric railway work for twenty-three years. He was with the Worcester (Mass.) Consolidated Street Railway for thirteen years before he accepted the appointment to the Connecticut Company at Stamford.

**Karl D. Klemm**, president of the Kansas City, Kaw Valley & Western Railway, Bonner Springs, Kan., has been elected colonel of the Second Missouri Field Artillery, a new regiment which he has recently assisted in organizing to war strength of six batteries. Colonel Klemm was promoted from captain to major of one of the batteries only a week before he was elected colonel. He has had a long experience, however, in military work. He was graduated from West Point in 1905, and has served in the Philippines, where during a part of his stay he held the civil office of president of a district. He was also stationed at Fort Snelling, Minn., for some time. He has had considerable cavalry experience. His service in the regular army ceased in 1911. Mr. Klemm then went to Kansas City. He has since devoted his time to building the interurban railway which was completed and put in operation three years ago between Kansas City and Bonner Springs, and is now operating to Lawrence, Kan. It is likely that Colonel Klemm will be ordered to concentration camp with his regiment about Aug. 4.

**M. G. Stratton**, whose appointment as general manager of the Shore Line Electric Railway, Norwich, Conn., was noted in the ELECTRIC RAILWAY JOURNAL of July 7, has been connected since 1913 with Sanderson & Porter, New York, N. Y., for whom he was engaged on valuation reports and the management of public utility properties, including the New England Investment & Security Company at Springfield and Worcester, Mass. Mr. Stratton is forty-seven years of age. He took the electrical engineering course at Cornell University as a member of the class of 1891. In 1891 and 1892 he was connected with the New York Edison Company in charge of the operation of the Twenty-sixth Street station and on outside construction. For four years following this he was superintendent of the electric department of the Lawrence (Mass.) Gas Company, and from 1896 to 1900 was superintendent of the meter department and assistant to the electrical engineer of the Narragansett Electric Lighting Company at Providence, R. I. For one year following this he was superintendent of the Mobile Light & Railway Company, Mobile, Ala., and from 1901 to 1903 was superintendent of the meter department of the Lachine Rapids Hydraulic Company at Montreal, Que. From 1903 to 1906 Mr. Stratton was connected with the Bay State Street Railway, Boston, Mass., as assistant to the electrical engineer in charge of the rehabilitation of the power houses of the Boston & Northern Street Railway and the construction of the Quincy power house and the substation and transmission lines of the Old Colony Street Railway. From 1906 to 1908 he was engineer with the Stone & Webster Engineering Corporation at Boston, Mass. During 1908 and 1909 he was engaged in a special investigation and on a report for the Buffalo (N. Y.) General Electric Company. From 1909 to 1911 he also investigated special engineering matters for the Bay State Street Railway. From 1911 to 1913 Mr. Stratton was general manager of the Northumberland County Gas & Electric Company at Sunbury, Pa. Following this began his connection with Sanderson & Porter, from which firm he has gone to the Shore Line Electric Railway.



G. H. HARRIES

**George H. Harries**, for years prominent as a public utility executive, has received a leave of absence from the various corporations with which he is connected in order to resume military service. He is now in command of the Nebraska National Guard, at Fort Crook, having been commissioned brigadier general by Governor Neville, as of June 25, and will be recommended by the War Department for similar rank in the regular army. Governor Neville in selecting General Harries to lead the three Nebraska regiments expressed the hope that when they become a part of the regular army on Aug. 5, by application of the draft, General Harries would continue to command the brigade. The Nebraska troops will be trained and brought to war strength at Deming, N. M. Since 1912 General Harries has been a vice-president of H. M. Byllesby & Company. He is also president of the Louisville Gas & Electric Company, the Omaha Electric Light & Power Company, the Arkansas Valley Railway, Light & Power Company and an officer in a number of other large utility organizations. During the past several months General Harries has been engaged in work for the Council of National Defense and War Department, having placed himself at the disposal of the government when war was declared on Germany. The son of an officer in the British army, born in Wales in 1860, General Harries came to the United States when a boy and served as a scout under Generals Miles and Crook in frontier wars with the Indians. He was a member of the government's commission settling the grievances of the Sioux Indians in 1891. In 1888 he went to Washington, D. C., as a newspaper reporter, later becoming president of the Metropolitan Railroad in that city. From 1897 to 1917 he was brigadier general in command of the military and naval forces of the District of Columbia, retiring as major general May 26 of the latter year. During the Spanish-American War he served as colonel of the First District of Columbia Infantry, United States Volunteers, participating in the siege of Santiago, Cuba. He has been a member of the War Department board on the promotion of rifle practice since organization. He has been president of the Association of Edison Illuminating Companies, president of the American Electric Railway Association and national commander of the Order of Indian Wars, composed of army officers.

# Construction News

Construction News Notes are classified under each heading alphabetically by States.

An asterisk (*) indicates a project not previously reported.

## RECENT INCORPORATIONS

**Boise (Idaho) Railway.**—Incorporated as successor to the Boise Railroad Company, Ltd. Capital stock, $200,000. Officers: David Miller, president; W. E. Pierce, vice-president, and Thomas R. Hamer, secretary and treasurer.

***Iowa & Omaha Interurban Railway, Council Bluffs, Ia.**—Articles of incorporation have been filed by the Iowa & Omaha Interurban Railway to construct and operate electric or steam railroads, furnish electricity or steam for power purposes and to control telephone and telegraph lines in connection with the road. Capital stock, $25,000. Officers: E. A. Wickham, president; J. P. Greenshields, vice-president; E. F. Danahey, secretary, and J. J. Wickham, treasurer.

***San Antonio (Tex.) Public Service Company.**—Incorporated in Texas to take over and operate the properties of the San Antonio Traction Company and the San Antonio Gas & Electric Company, both controlled by the American Light & Traction Company. Capital stock, $4,700,000. The new company is also authorized in its charter to construct a system of interurban electric railways out of San Antonio, and it is reported will build a line between San Antonio and Austin, about 85 miles. The San Antonio & Austin Traction Company has been promoting the construction of this proposed road for some time past. The directors of the San Antonio Public Service Company are Emerson McMillin, New York, chairman of the board of directors of the American Light & Traction Company; A. P. Lathrop, New York; W. B. Tuttle, R. C. Jones, Walter P. Napier, S. J. Brooks and Howard Templeton, San Antonio.

## FRANCHISES

**Santa Ana, Cal.**—The Pacific Electric Railway has received a fifty-year franchise from the Board of Supervisors of Orange County to construct a line on Lyon Street, Williams Street, Glen Avenue and Sixth Street, from Glen Avenue to the easterly line of D Street or State Highway, Santa Ana.

**Syracuse, N. Y.**—The improvements of the service extended in Syracuse by the New York State Railways have been made possible through the approval by the Public Service Commission for the Second District of New York of the franchises granted that corporation by the Common Council of Syracuse on April 23, and approved by the Mayor and Board of Estimate and Apportionment of that city. The improvements comprise minor changes in the track system to facilitate the operation of the new single-end cars.

**Smithville, Tenn.**—The County Court of DeKalb County has granted the Nashville & Eastern Electric Railway a two years' extension of time from Dec. 31, 1917, on its franchise in which to construct its line from Lebanon to Smithville. [Sept. 9, '16.]

**Dallas, Tex.**—The City Commission of Dallas has granted the Dallas Northwestern Traction Company and the Dallas Southwestern Traction Company three months' extension of time on their franchise in which to begin construction on their proposed lines from Dallas to Slidell and from Dallas to Cleburne. E. P. Turner, Dallas, president. [July 7, '17.]

**El Paso, Tex.**—The El Paso Electric Railway has asked the City Council for a franchise to construct an extension on Campbell Street from Hague Street to Kern Place.

**Petersburg, Va.**—The Petersburg & Appomattox Railway has asked the City Council of Petersburg for a franchise to construct an extension from the present main line at the eastern limits of the city along East Bank, East and Bollingbrook Streets to Second Street.

## TRACK AND ROADWAY

**Northern Alabama Traction Company, Florence, Ala.**—Surveys are being made of this company's proposed line from Florence to Huntsville, with a branch line to Lexington, and it is expected that construction work will be begun about Sept. 1. The Central Construction Company of Indianapolis, Ind., has the contract to build the road and agrees to have it completed and ready for operation by October, 1919. Thurston H. Allen, Huntsville, general manager. [March 17, '17.]

**Rockford (Ill.) City Traction Company.**—It is reported that this company will construct an extension on Seventh Street from Twenty-third Avenue to Harrison Avenue connecting with the line of the Chicago Milwaukee & Gary Railroad.

**Union Traction Company of Indiana, Anderson, Ind.**—This company is reconstructing its line on Third Street from Madison Avenue to Sycamore Street, new 80-lb. rail being used.

**Gary & Southern Traction Company, Crown Point, Ind.**—Work will be begun at once by the Gary & Southern Traction Company on the construction of an extension between Lattaville Junction and Griffith.

**Boston (Mass.) Elevated Railway.**—The Public Service Commission of Massachusetts has ordered the Boston Elevated Railway to build a double-track surface line in Pleasant Street between Washington Street and the southerly entrance of the Tremont Street subway, in order to provide for faster service between the South Boston district and the retail shopping center of the city.

**Duluth (Minn.) Street Railway.**—Work has been begun by the Duluth Street Railway reconstructing its tracks on West Third Street between Twenty-first and Twenty-eighth Avenues, the old rails being replaced with a heavier type of rail.

**United Railways, St. Louis, Mo.**—This company will construct an extension of its Hamilton Avenue line west on Delmar Boulevard to Skinker Avenue, to the north line of Forest Park, and west on the Clayton car tracks to DeMun Avenue.

**Brooklyn (N. Y.) Rapid Transit Company.**—Work has been begun by the Brooklyn Rapid Transit Company on the construction of an extension on Metropolitan Avenue and Dry Harbor Road, Middle Village, to Jamaica Avenue, Richmond Hill.

**Buffalo & Lake Erie Traction Company, Buffalo, N. Y.**—Permission has been granted to the Buffalo & Lake Erie Traction Company by the City Council of Dunkirk to tear up a portion of the lines of the Dunkirk Street Railway, a subsidiary line, which holds the franchise for the system known as the belt line in Dunkirk. The company will continue to operate the line in East Lake Road to the city line.

**Cincinnati (Ohio) Traction Company.**—At a special meeting on July 13 the City Council of Cincinnati, Ohio, ordered extensions to four of the Cincinnati Traction Company's lines. Their construction will mean the expenditure of more than $250,000 before the end of the year. They are as follows: Warsaw Avenue line from the present terminus out Glenway Pike to Covedale; Sixth Street across the Hopple Street viaduct; McMicken to Dysmuth Avenue, and North Norwood to Pleasant Ridge and Kennedy Heights.

**Ohio Electric Railway, Springfield, Ohio.**—The line of the Ohio Electric Railway between Springfield and Dayton runs directly through the ground which has been selected for the Wilbur Wright Aviation Field. The section of the electric line within the camp is to be removed and 3½ miles of new track laid around the border of the camp. This construction work is already well under way, the right-of-way being moved almost a mile at the maximum point and increasing the length of the line about ⅓ mile. The new line is being laid with 70-lb. rail on an 18-ft. gravel ballast roadbed, with concrete culverts and first-class construction throughout.

**Mahoning Valley Railway, Youngstown, Ohio.**—The New Castle Electric Street Railway and the Mahoning Valley Railway will together pay to Lawrence County 30 per cent of the cost of the construction of the new Mill Street bridge over Neshahannock Creek. Under the terms of the agreement the bridge is to cost not more than $66,000, and of this amount the two companies will pay $19,000. This amount will go into the construction of the bridge and will be exclusive of the trolleys, tracks and extra equipment for the use of the company. The bridge will be 54 ft. wide, with allowance for a double-track system.

**Ardmore (Okla.) Railway.**—Plans are being developed by the Ardmore Railway for the construction of a system of electric interurban lines covering the entire Healdton, Fox and other producing oil fields. It is proposed to have the lines center at the new town of Healdtown. The plan contemplates the inauguration of both freight and passenger service on these lines.

**Johnstown (Pa.) Traction Company.**—Work will soon be begun by this company double-tracking its line on Baumer Street.

**Wisconsin Interurban System, Madison, Wis.**—It is reported that negotiations are under way with the receiver of the Janesville & Madison Traction Company for the purchase by the Wisconsin Interurban System of the 2½ miles of track between Fair Oaks and the town hall of Blooming Grove. J. E. Jones, Madison, president. [July 14, '17.]

## SHOPS AND BUILDINGS

**Public Service Railway, Newark, N. J.**—This company has filed plans for the construction of four one-story carhouses at the Passaic Wharf, each about 50 ft. x 145 ft., to cost $23,600.

**Northern Ohio Traction & Light Company, Akron, Ohio.**—This company is building a new freight house in Tuscarawas Street W., just west of the company's carhouse.

**Southern Cambria Railway, Johnstown, Pa.**—This company reports that within the next three months it will place contracts for the construction of a small carhouse at Ebensburg to accommodate lay-over cars at the Ebensburg terminal.

## POWER HOUSES AND SUBSTATIONS

**Pine Bluff (Ark.) Company.**—This company reports that within the next six weeks it expects to purchase one 2500-kw. turbo-generator and two 600-hp. boilers.

**Havana Electric Railway, Light & Power Company, Havana, Cuba.**—This company reports that it is erecting a new substation to contain two 1000-kw. rotaries and another to contain three 500-kw. rotaries. The purchase of a new 25,000-kw. turbine generator for the power plant has been authorized.

**Georgia Railway & Power Company, Atlanta, Ga.**—Plans are being prepared by the Georgia Railway & Power Company for the construction of a sixth unit at the Tallulah Falls hydroelectric plant, increasing the output by 12,000 kw., at a cost of about $330,000.

**Washington, Baltimore & Annapolis Electric Railway, Baltimore, Md.**—Plans are under way by this company for an electric transformer station, from which will be furnished electric light and power for the military encampment at Admiral.

**Vicksburg Light & Traction Company, Vicksburg, Miss.**—A report from the Vicksburg Light & Traction Company states that the company is installing a 1250-kw. G.E. turbine and an Alberger condenser in its power plant.

**Morris County Traction Company, Morristown, N. J.**—Rotaries and other equipment are being installed by the Morris County Traction Company in its new substation at Mine Hill. The New Jersey Power & Light Company furnishes the service at high voltage for step-down and distribution by the traction company.

**Monongahela Valley Traction Company, Fairmont, W. Va.**—Construction will soon be begun by the Monongahela Valley Traction Company of a new power plant at Rivesville. Contracts for the equipment and the bulk of the construction have been let.

**Wisconsin Traction, Light, Heat & Power Company, Appleton, Wis.**—The power house of the Wisconsin Traction, Light, Heat & Power Company was recently damaged by fire, caused by lightning, to the extent of about $5,000.

# Manufactures and Markets

Discussions of Market and Trade Conditions for the Manufacturer, Salesman and Purchasing Agent

Rolling Stock Purchases Market Quotations Business Announcements

## Difficulties of the Railway Supply Man

### Business to Be Had if Railways Were Able to Buy—Relief Expected from Railways Near Army Cantonments

"The business is there if the railways had the wherewithal to buy" are the words which an Eastern railway supply man used in summing up the present situation as regards the accessory business. Continuing, he said: "The dollars which they use in making purchases have been cut in two, but the nickels which they receive for fares have remained the same. At the present time many railways are petitioning for higher fares, and in case these are granted the railways will immediately be in a position to purchase much-needed supplies." As one railway man expressed it, "We are not buying anything beyond that which is absolutely necessary," and this holds true in a good many instances. However, thirty-two army cantonments for the regular army and the National Guard are being constructed in different parts of the United States, and the railways in cities near these camps are in the market or will be in the market for additional equipment. Some of the railways are buying new cars, while others are rebuilding or remodeling old cars, and this, of course, makes a market for a number of accessories. The following suggestions are made by a well-known agent of accessories who is well qualified to comment on this matter:

#### RAILWAY OFFICIALS OFTEN WASTE SALESMEN'S TIME

If anything at all can be done to help reduce selling costs it can be done by many railway officials, and the railways will be the ones to benefit. Very often the officials actually want to do business, but instead they simply waste a lot of time. On a certain deal, three days were spent on the railway property by a manufacturer's agent where much less time would have been sufficient. After thoroughly convincing the master mechanic during the first day that the equipment was just what was needed, the matter was put up to the general manager, who was not able for various reasons to give time enough to make a decision or to hear the recommendations of the master mechanic. The deal was finally closed on the third day, when the general manager approached the master mechanic and, calling him by his first name, said, "Well, is this the stuff you need and is it O. K.?" To this the master mechanic answered, "Yes." The general manager then said, "All right, go ahead," or words to that effect, and the deal was closed accordingly.

This is given as an example of many incidents similar in nature which eat into the meager profits of the accessory manufacturer. It is true that the railway men generally mean well, but they often get tied up with other matters and keep the traveling man waiting on account of not realizing the value of the salesman's time. However, when a salesman visits a property, if the railway man and the salesman would get right down to business and finish it, that would be a different matter. With the exception of some parts of the East, traveling expenses have just about doubled for salesmen of most supplies, and delays of the kind mentioned are very discouraging.

It is often the case that a railway supply man representing several lines of equipment will visit a property to talk about a specific order. The salesman may or may not get the order, but any attempts at missionary work on the other lines of accessories are usually frowned upon. The railway executive likes to take up a certain definite proposition and does not care to spend time on any others. If, however, the same official wants information within three or four weeks regarding another accessory, he does not hesitate to tell the railway supply man so, and this may mean another trip out to the property which he had visited probably within a month. In these days of high prices and poor deliveries, the railway executive should be forehanded, and one way of doing this is to get inquiries and delivery quotations while the railway supply man is on the property on every product that he is liable to be interested in within six months.

With a very few exceptions, there is little money to be made in handling repair parts at the present time. It is not uncommon for a railway to write in for perhaps a half dozen repair parts where formerly ten or twelve dozen were ordered. To make up small orders such as the above, it is necessary to set up a machine, and this operation probably will cost more than will be obtained from the whole order.

## Exporters' Contracts Are to Specify Shipping Clauses

### Manufacturers Should Quote Delivered Prices—Catalogs with Cable Addresses Needed—Electrical Exports Increasing

In view of the fact that public necessity may in the future require the requisition of vessels by the government, and as this may be done quickly with but little time for adjustment, the Bureau of Foreign and Domestic Commerce has advised that exporters, in making contracts for export, should state in the contracts that shipment is to be contingent on their obtaining shipping space. The bureau also suggests that exporters will save themselves much annoyance and possible claim for damages if a clause is inserted in bills for sale stating that the sale is made subject to the seller's ability to secure an export permit, if such permit is required.

Foreign agents, commercial attachés and consular agents are urging upon American manufacturers the importance of being able to quote delivered prices at the nearest port to which supplies are shipped. It is difficult to imagine the position of the foreign buyer when he attempts to find out what the goods will cost him laid down at some particular port. In almost every case he has few facilities for finding out this information as compared with American firms. Rising freight rates, of course, make this a difficult matter, but there is no question that this information would be of immense value in competing with European firms which have heretofore had the advantage over American salesmen on account of knowing just what goods cost at their destination. Communications recently received assert that a number of directories of American manufacturers have been received, but in no case is the cable address given. It would be useful for the foreign user to know the cable address of manufacturers and merchants, as inquiries are often made by cable.

#### ELECTRICAL EXPORTS SHOW LARGE INCREASES

Figures which have been taken from a report compiled by the Bureau of Foreign and Domestic Commerce show that exports of electrical supplies for the month of April, 1917, amounted to $4,740,995, as compared with $2,630,169 in April of the previous year. Added to the figures for the three preceding months, the April exports bring the total for the first four months of 1917 up to $18,379,351, or at an annual rate of over $55,000,000. During the ten months ended April last the exports of electrical merchandise amounted to $41,733,199, as compared with $23,666,267 for the ten months ended April, 1916, and $15,922,467 for the ten months ended April, 1915.

# Materials Continue to Soar

## Analysis of Costs of Supplies by the Reading Transit & Light Company Shows the Problems Railways Are Facing

This company recently called attention to the great advance in prices of some of the materials necessary in the operation of electric power and railway systems. The latest statement by this company contains a summary of increases in the price of materials used. It follows: "We mentioned coal costing $200,000 more this year than last and increases of $80,000 in the annual payrolls of our employees and an advance of 44 per cent in the price of steel rails. But we were merely scratching the surface. Copper wire, electrical machinery and a multitude of other things used in constructing, renewing, repairing, operating and keeping our properties up to the high standard of efficiency which the public demands are costing a whole lot more than they did two years ago. It is also necessary to face the handicap of being compelled to place orders for materials from three months to two years ahead of time of delivery. Some materials can scarcely be procured at any price. Steel car wheels, for instance, have practically disappeared from the market. They were last heard of at $18 apiece, but for some time it has been impossible to get anybody to quote a price on them. Cast-iron wheels are selling at $1.80 per 100 lb. on big contracts, compared with $1.45 two years ago, an advance of about 25 per cent."

### PRICES PAID FOR MATERIALS AS SHOWN BY FILES

This company has taken figures at random, from its purchasing department, showing the sharp advance in prices of some materials to-day, compared with two years ago. Rails have increased 100 per cent over normal prices. To-day they are quoted at $55 a ton for delivery a year hence, and for short-time delivery the price is $75 a ton. Two years ago steel rails were selling at $38.20, so that what is regarded as the normal price to-day is an advance of 44 per cent. There is an even greater advance in special track work, which means curves, switches and the like, the increase in these materials being fully 200 per cent. Copper that is required in large quantities for repairs to trolley and electric equipment has nearly trebled its normal price. Copper trolley wire is now quoted at 38 cents a pound compared with 17 cents in 1915. Copper feeder cable has advanced from 18 cents to 34¼ cents a pound in the same period.

Motor equipment has advanced over 50 per cent, and following are some of the other advances:

| | 1915 | 1917 |
|---|---|---|
| Track spikes, per 100 lb. | $2.15 | $4.00 |
| Steel trolley poles, each | 1.10 | 2.10 |
| Track plates, per pound | 0.02½ | 0.10 |
| Steel and iron bars, per pound | 0.01¾ | 0.04¾ |
| Cotton waste, per pound | 0.09 | 0.13 |
| Chestnut ties, each | 0.40 | 0.60 |
| Cement, per bbl | 1.29 | 2.09 |
| Gravel, per ton | 1.25 | 2.00 |
| Crushed stone, per ton | 0.50 | 1.00 |

# Largest Ball-Bearing Car Order

## 141 One-Man Cars for Stone & Webster Will Have Ball Bearings in Both Motors and Main Journals

In working out the designs for the light-weight one-man cars to be used on a number of its properties, the Stone & Webster Management Association has been consistent in taking advantage of every opportunity to reduce the power consumption and increase the reliability of operation of the cars. As a part of this policy it was decided to equip both the motors and the main journals of these cars with Gurney ball bearings. This type of bearing was chosen because of its great load capacity, and in the case of the journal bearings because it makes special provision for taking care of the thrust loads that are occasioned by going around curves.

This is undoubtedly the largest order ever placed for anti-friction bearings for electric railway service. Another recent large order received by the same company is from the J. G. Brill Company, Philadelphia, Pa., for fifty-four cars for stock.

# Copper Market Quiet

Owing to the uncertainty of the government's action in regard to the price to be paid for the 60,000,000 lb. of copper tentatively arranged for with the copper producers at 25 cents a pound, copper has declined slightly, and is still in a waiting stage. The government has now agreed to pay 75 per cent of the 25 cents a pound as a preliminary settlement, leaving the balance to be adjusted by an investigating committee of the Federal Trade Commission. The copper producers, however, have not accepted the government's offer, and as a result buyers who are known to be in the market for large quantities are still holding off pending a settlement between the producers and the government in order to determine whether the price named will apply to other users of copper. Large producers are not making quotations and it is probable that the market will continue dull until some definite price has been arranged for between the government and the producers.

# Swiss Railways to Purchase Supplies

In connection with the electrification of the Swiss Federal Railways, the government has created a special department, known as Direktion für die Einführung der elektrischen Zugförderung der Schweizerischen Bundesbahnen, Berne, Switzerland. This department, according to a recent report of the Bureau of Foreign and Domestic Commerce, announces that it is prepared to consider proposals for sale and delivery of such electrical material as may be necessary for equipment in connection with this work, and that bids will be received from all countries. A statement by the management shows that large orders for copper wire already have been placed with certain firms in the United States, and that British and German firms are applying for details in order that they may submit offers for supplies and equipment.

# Old Material Prices Drop

With the exception of the drop in copper, influenced largely by the action of the government in regard to the price to be paid for that material, the principal feature of the past week was the heavy decline in old materials. The heaviest reduction was in heavy steel scrap, which dropped from $40 to $32 a ton. Railroad wrought iron fell off $7 a ton, steel car axles $4, old car wheels $2, scrap steel rails $5, and machine shop turnings $1. As old materials play an important part in steel manufacturing costs, the reaction is not unlikely to have an effect on finished prices. The railways are showing no disposition to sell on account of the present weakness of the market, and there has been very little buying reported.

# Big Demand for Spraying Equipment

According to the Spray Engineering Company, Boston, Mass., sales of its equipment for the month of June were the best in the history of the organization. Inquiries are being received from foreign countries, and recent sales include cooling ponds or equipment for China, Ecuador and Cuba.

In addition to many large domestic orders placed by the steel mills coal companies and other allied industries it has received orders for the following: Minneapolis (Minn.) General Electric Company air washer, capacity 60,000 cu. ft. per minute; United Gas & Electric Company, New Orleans, La., one air washer, capacity 50,000 cu. ft. per minute, and for the Consolidated Gas & Electric Company, Baltimore, Md., the largest washer the company has so far built, having a capacity of 125,000 cu. ft. of air per minute. At the Waterbury (Conn.) station of the Housatonic Power Company a fifty-thousand-dollar spray cooling installation is to be completed within six weeks, and a novel feature of this installation will be the supporting of the spray nozzles by Archbold-Brady structural steel frames 50 ft. over the river edge without supporting piers in the water. This construction was determined upon to avoid difficulties from ice in the neighborhood of foundations.

## NEW YORK METAL MARKET PRICES

| | July 12 | July 19 |
|---|---|---|
| Prime Lake, cents per lb. | 30¾ | 26½ |
| Electrolytic, cents per lb. | 30¾ | 26½ |
| Copper wire base, cents per lb. | 36 | 36 |
| Lead, cents per lb. | 11⅛ | 10½ |
| Nickel, cents per lb. | 50 | 50 |
| Spelter, cents per lb. | 9⅛ | 8⅞ |
| Tin, Straits, cents per lb. | 63 | 62½ |
| Aluminum, 98 to 99 per cent, cents per lb. | 58 | 55 |

## OLD METAL PRICES

| | July 12 | July 19 |
|---|---|---|
| Heavy copper, cents per lb. | 27 | 26½ |
| Light copper, cents per lb. | 24½ | 23½ |
| Red brass, cents per lb. | 20 | 19½ |
| Yellow brass, cents per lb. | 18 | 17½ |
| Lead, heavy, cents per lb. | 9¼ | 9 |
| Zinc, cents per lb. | 7 | 6¼ |
| Steel car axles, Chicago, per net ton | $50.00 | $46.50 |
| Old car wheels, Chicago, per gross ton | $38.00 | $36.00 |
| Steel rails (scrap), Chicago, per gross ton | $48.00 | $43.00 |
| Steel rails (relaying), Chicago, per gross ton | $59.50 | $59.50 |
| Machine shop turnings, Chicago, per net ton | $20.00 | $19.00 |

## CURRENT PRICES FOR MATERIALS

| | July 12 | July 19 |
|---|---|---|
| Rubber-covered wire base, New York, cents per lb. | 36½ | 36½ |
| No. 0000 feeder cable (bare), New York, cents per lb. | 36½ | 36½ |
| No. 0000 feeder cable stranded, New York, cents per lb. | 33¾ | 33¾ |
| No. 6 copper wire (insulated), New York, cents per lb. | 33 | 33 |
| No. 6 copper wire (bare), New York, cents per lb. | 36 | 36 |
| Rails, heavy, Bessemer, Pittsburgh | $38.00 | $38.00 |
| Rails, heavy, O. H., Pittsburgh, per gross ton | $40.00 | $40.00 |
| Wire nails, Pittsburgh, per 100 lb. | $4.00 | $4.00 |
| Railroad spikes, 9/16 in., Pittsburgh, per 100 lb. | $5.00 | $5.00 |
| Steel bars, Pittsburgh, per 100 lb. | $500 | $4.50 |
| Sheet iron, black (24 gage), Pittsburgh, per 100 lb. | $8.35 | $8.35 |
| Sheet iron, galvanized (24 gage), Pittsburgh, per 100 lb. | $9.55 | $9.55 |
| Galvanized barbed wire, Pittsburgh, cents per lb. | $4.85 | $4.85 |
| Galvanized wire, ordinary, Pittsburgh, cents per lb. | $4.65 | $4.65 |
| Cement (carload lots), New York, per bbl. | $2.22 | $2.22 |
| Cement (carload lots), Chicago, per bbl. | $2.31 | $2.31 |
| Cement (carload lots), Seattle, per bbl. | $2.60 | $2.60 |
| Linseed oil (raw, 5 bbl. lots), New York, per gal. | $1.13 | $1.13 |
| Linseed oil (boiled, 5 bbl. lots), New York, per gal. | $1.14 | $1.14 |
| White lead (100 lb. keg), New York, cents per lb. | 12¾ | 12¾ |
| Turpentine (bbl. lots), New York, cents per gal. | 41½ | 40 |

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## ROLLING STOCK

**Adrian (Mich.) Street Railway** is reported to have placed an order for twelve light-weight safety cars.

**Cleveland, Southwestern & Columbus Railway, Cleveland, Ohio,** is planning to build four new freight trailers.

**Long Island Railroad, New York, N. Y.,** is reported to be in the market for forty motor and twenty-five trailer cars.

**Hocking-Sunday Creek Traction Company, Athens, Ohio,** has been authorized by the Public Service Commission to purchase two cars.

**Pine Bluff Company, Pine Bluff, Ark.,** is in the market for one 2500-kw. turbo-generator, two 600-hp. boilers and eight small railway motors.

**Scioto Valley Traction Company, Columbus, Ohio,** is in the market for several second-hand passenger trailers for use in connection with the traffic expected from the military training camp now under construction at Chillicothe, Ohio.

**Mason City & Clear Lake Railroad, Mason City, Iowa,** noted in the May 19 issue as placing an order for five one-man safety cars with the American Car Company, has specified the following details for this equipment:

| | |
|---|---|
| Number | 5 |
| Date of order | June 18, 1917 |
| Date of delivery | Oct. 3, 1917 |
| Builder | American Car Co. |
| Type | Light weight safety |
| Seating capacity | 28 |
| Over bumpers | 30 ft. 9½ in. |
| Over vestibule | 29 ft. 9½ in. |
| Width over all | 8 ft. 0 in. |
| Rail to trolley base | 9 ft. 9 in. |
| Body | All steel |
| Interior trim | ¼ in. oak |
| Headlining | Agasote |
| Roof | Arch |
| Air brakes | Westinghouse |
| Axles | Hammered steel |
| Control | Type K 10-Q |
| Curtain fixtures | Rex |
| Curtain material | Pantascte |
| Dest. signs | E. S. S. Co. |
| Door mechanism | Safety Car Devices |
| Fare boxes | International |
| Fenders | Tri-City |
| Gears and pinions | West. |
| Hand brakes | Peacock |
| Heaters | Peter Smith Electric |
| Headlights | Golden Glow |
| Journal boxes, | Gurney ball bearing |
| Lightning arresters | West. |
| Motors | 2 West. 506A., inside hung |
| Paint | Chicago Varnish Co. |
| Sanders | Ohio brass |
| Sash fixtures | O. M. Edwards |
| Seats, style | Hale & Kilburn 199-A |
| Seating material | Rattan |
| Step treads | Feralum |
| Trolley catchers or retrievers, | Ohio Brass |
| Trucks, type | Brill 78M1 |
| Ventilators | Automatic |
| Wheels | 24 in. |

**City of Seattle, Wash.,** is in the market for eight one-man cars for use on the present municipal railway. The council recently passed an ordinance appropriating $25,000 toward this order.

**Kankakee & Urbana Traction Company, Urbana, Ill.,** has purchased two interurban cars, one motor and one trailer, from the Wilkes-Barre & Hazleton Railway. Each car is 52 ft. long and has a capacity of 100 passengers.

**Washington, Baltimore & Annapolis Electric Railroad, Baltimore, Md.,** noted in the July 14 issue as being in the market for 100 day coaches for handling troop movements in and out of the government's camp at Annapolis Junction, Md., has purchased fifty-four passenger coaches from the Long Island Railroad for immediate delivery. The company will expend about $350,000 in extensions, including the grading and laying out of two miles of double track, and the construction of a transformer station for furnishing electric light and power.

**Rockford & Interurban Railway, Rockford, Ill.,** has specified the following details for thirteen vestibuled pay-within cars which are being built for this company by the St. Louis Car Company.

| | |
|---|---|
| Number of cars ordered | 13 |
| Name | Rockford & Interurban |
| Builder | St. Louis Car |
| Type | Vestibuled pay-within |
| Seating capacity | 40 |
| Weight (total) | 36,840 lb. |
| Truck centers, length | 19 ft. 0 in. |
| Length over bumpers | 41 ft. 4 in. |
| Length over vestibule | 40 ft. 4 in. |
| Width over posts | 8 ft., 2 in. |
| Height, floor to ceiling | 7 ft. 6 in. |
| Sill to trolley base | 8 ft. 5¼ in. |
| Body | Steel sides with wooden superstructure |
| Interior trim | Honduras mahogany |
| Headlining | 3/16 in. Agasote |
| Roof | Turtle deck |
| Underframe | Steel |
| Air brakes | Westinghouse |
| Axles | St. Louis Car |
| Bumpers | Rico anti-climbers |
| Cable | St. Louis Car |
| Car trimmings | Bronze |
| Conduits | St. Louis Car |
| Couplers | St. Louis Car |
| Curtain fixtures | Forsyth No. 88 |
| Curtain material | Pantasote No. 77 |
| Door | Hand operated St. Louis Car |
| Designation signs | Illuminated, St. Louis Car Co.'s box, E. S. S. Co. mechanism |
| Fenders | Railway's design |
| Gongs | 12 in. bronze pneumatic |
| Hand brakes | Ackley |
| Hand straps | Rico sanitary |
| Heaters | Peter Smith No. P-2 |
| Headlights | Crouse-Hinds |
| Journal boxes | St. Louis Car |
| Lightning arresters | Westinghouse |
| Motors | West. 532-B, outside hung |
| Paint | Murphy ABC. |
| Registers | International R-5 |
| Sandbox with Reliance sand trap valve | |
| Sash fixtures | O. M. Edwards |
| Seats | Cross and longitudinal, Hale & Kilburn |
| Seating material | Rattan |
| Springs | Pittsburgh Steel Spring |
| Step treads | Mason |
| Trucks, type | St. Louis Car Co.'s 106 A maximum traction |
| Ventilators | Automatic |
| Wheels | 32 in. driver, 21 in. pony, cast-iron |
| Special devices | Faraday buzzers |

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## TRADE NOTES

**Cutler-Hammer Manufacturing Company, Milwaukee, Wis.,** announces the removal of its New Haven office to 962 Chapel Street.

**Blaw Steel Construction Company, Pittsburgh, Pa.,** and the Knox Pressed & Welded Steel Company have consolidated under the name of the Blaw-Knox Company. The personnel of the two organizations will remain unchanged.

**Robert E. Rae,** for many years with the Western Electric Company, and for the past four years sales manager for Stanley & Patterson, New York, manufacturers of electric signal apparatus and lighting specialties, has resigned from the latter concern.

**Anaconda Copper Company, Butte, Mont.,** has already started construction on a wire and rod mill at Great Falls, Mont., to cost between $500,000 and $1,000,000. It will have a capacity of 200,000 lb. of copper rods daily, and about 100,000 lb. of copper wire.

**Ray D. Lillibridge, Inc., New York, N. Y.,** announces that the entire firm are going to "vacation" from Aug. 11 to Aug. 27, except one clerk, who will remain to explain the situation to any one who may call. This plan was followed last year and proved satisfactory to all concerned.

**Duquesne Electric & Manufacturing Company, Pittsburgh, Pa.,** dealer in new and used electrical apparatus and power equipment, has opened a branch office in the Marshall Building, Cleveland, Ohio. William L. Moorehead, vice-president of the company, is in charge of the Cleveland office.

**S. G. Swigert,** consulting engineer, has reopened an office in Akron, Ohio, having closed his office in Missoula, Mont. Mr. Swigert located and built several of the early suburban electric railways near Akron, Ohio. Recently he has been engaged in consulting civil and hydraulic engineering in the West. From 1912 to 1916 he was irrigation manager of the Flathead project, United States Reclamation Service.

**Walter A. Zelnicker Supply Company, St. Louis, Mo.**, and affiliated companies are now represented in the Birmingham district by Thomas A. Hamilton, who for the past fourteen years has been connected with Crane Company, prior to which he was superintendent of the East St. Louis plant of the Zelnicker car shops. Mr. Hamilton will be stationed at 1018 Woodward Building, Birmingham, Ala., and will have charge of both buying and selling in the Southeastern district.

**General Electric Company, Schenectady, N. Y.**, announces that it has closed a contract for one 10,000-kw. turbo-generator for the Rochester Railway & Light Company. It is also in receipt of an order for two 2500-kw., 600-volt rotary converters complete with transformers, etc., for the New York Central Railroad Company's electrified division. One of the rotaries will be installed in the Fiftieth Street substation, while the other one has been ordered for the Ossining substation.

**Western Electric Company, Chicago, Ill.**, announces several changes in its sales and warehouse organization. W. H. Quirk has been appointed manager of the company's house at Cincinnati, Ohio. W. L. Sioussat will succeed Mr. Quirk as stores manager in the company's Cleveland house. S. Greenfield of the Philadelphia house will head the sales force of the new Baltimore branch at 425 East Oliver Street. The company will be represented in Charlotte by a warehouse and a sales office at 238 West First Street, with R. H. Bouligny in charge. An office and warehouse has also been opened in New Haven by Tyler L. Holmes at 135 Wood Street.

**Richard Russell**, manufacturer of the well-known trigger-lock reversible controller fingers, has recently moved into a new factory at Niagara Falls, N. Y. The building is constructed of steel and concrete on a plot 102 ft. x 60 ft. Large storage fireproof vaults for bar copper and finished goods are included in the construction of the building. These are conveniently located for handling raw bar copper for the machine shop and for shipping the finished goods. The machine shop is equipped with the latest automatic machinery for economical and efficient production. Trigger lock reversible controller fingers are now standard on more than 200 electric railways in the United States.

**F. H. Tackaberry**, the general agent of the American Steel Export Company, sailed from New York City on Saturday, July 7, on the Lamport & Holt steamer Vestris for South America. Mr. Tackaberry will cover a large portion of the Latin-American countries, visiting the following important cities: Rio de Janeiro, Sao Paulo, Buenos Aires, Montevideo, La Plata, Rosario, Valparaiso, Santiago, etc. Primarily, the reason of Mr. Tackaberry's trip will be to collaborate with the company's various agents throughout South America, lending every possible aid and acquainting them more thoroughly with the facilities available at the home office, and also with the market conditions in this country for iron and steel and engineering and contracting.

**Chester F. Gailor** has been elected president of the Atlantic Welding Company (formerly the Atlantic Welding Corporation), 30 Church Street, New York City. Mr. Gailor has been associated with this company for several years past since he resigned as assistant chief engineer of the United Railways & Electric Company of Baltimore. Previous to his work at Baltimore he was roadmaster of the Connecticut Company at Hartford and prior to that he held positions in other railway companies and with rail welding interests. Mr. Gailor therefore has an unusually well-rounded experience for developing the class of business in which he is now engaged. E. Walter Jansen has been elected treasurer of the company. He has been connected with this company ever since its organization in 1914. Previous to the commercial exploitation of this company's product he spent a considerable period in this country and abroad in laboratory research work involving metallurgical, thermodynamic and static problems entering into rail welding and other metallurgical work.

## NEW ADVERTISING LITERATURE

**Corliss Carbon Company, Bradford, Pa.**, has issued a discount sheet applying to its catalog No. 4.

**Laclede-Christy Clay Products Company, St. Louis, Mo.**: A wall card warning, "Look Out" for your future delivery inquiries.

**V. V. Fittings Company, Philadelphia, Pa.**: A bulletin descriptive of four types of safety switches, each containing a high grade slate base and an air-break knife switch.

**Westinghouse, Church, Kerr & Company, New York, N. Y.**: A bulletin, "A Floor Every Six Days," descriptive of the progress made on a recent building containing a 6000-hp. boiler plant. This reinforced concrete building of the flat slab type of construction was formed and poured at the rate of a floor every six working days.

**American Steel Foundries, Chicago, Ill.**: A calendar containing a large illustration at the top of each page, depicting the several branches of the steel industry. The arrangement of the calendar is convenient, the current month being in the center of the sheet, while the preceding month is shown above and the succeeding month below.

**Oakley Chemical Company, New York, N. Y.**: Bulletin No. 8 on Oakite Platers' Cleaner. Contains a description of this company's product which represents a new principle in cleaning by emulsifying oils and greases, thus destroying their adhesive nature by means of a purely physical action. Methods of cleaning, plating, lacquering and tinning are given.

**General Electric Company, Schenectady, N. Y.**: Bulletin No. 48,900, on CR-9500 automatic solenoid brakes and CR-9500 solenoids, contains interesting data for both a.c. and d.c. solenoid brakes possessing automatic or self-adjusting features. Each brake is a self-contained unit and is usually mounted on the driving shaft or bolted to the floor.

**Gold Car Heating & Lighting Company, New York, N. Y.**: A booklet on electric thermostatic control of steam heating for all passenger train cars. Describes and illustrates this company's equipment and explains the system of maintaining a predetermined uniform temperature in cars. Also contains diagrams and test data showing the even temperature obtained and the saving effected by application of this equipment.

**Railway Utility Company, Chicago, Ill.**: A forty-eight-page booklet, "The Solution of the Problem," which is the story of the events which led up to the awarding of a $200,000 contract by the Chicago Surface Lines to the Railway Utility Company for equipping its cars with this company's "Exhaust" type ventilators. The story of the summary of the problem, its solution attempted, the ventilating problem solved and how tests were made are subjects which will be of interest to all railway equipment men. The last half of this booklet is devoted to the Utility compensating system of natural ventilation and Utility control for street, elevated and interurban cars.

## New Publications

**Principles of Economics.** By Edward R. A. Seligman, LL.D. Longmans, Green & Company, New York, N. Y. 711 pages. Cloth, $2.50 net.

This is the seventh edition of a book published originally as recently as 1905. In addition to the seven editions in English, the work has been translated into Russian, Japanese and French. In the present edition the introductory matter has been rewritten. In the body of the book chapters have been added on the control of trusts, labor legislation and labor insurance. Room has also been found for treatment of the federal reserve act. In other respects the discussion and references have been brought down to date. The work has been deservedly popular, and the reading of it in the light of the trend of present-day events should be distinctly profitable, for very important changes in our economic structure would appear to be inevitable. Sections of Professor Seligman's work that particularly deserve the attention of railway men are "International Trade," "Transportation," "Principle of Railway Charges," "Discrimination," "Railway Regulation" and "Socialism and Public Ownership."

# It Looked Fine But It Was Slow

—was the ancient warship. Forty or fifty slaves sweating at the oars didn't get it through the water as fast as one lone man in his shirt-sleeves can travel in a motor boat. The difference lies in **how you apply the power,** no matter whether you want to get speed in traveling or, if it's a matter of **brakes,** speed in **stopping** your cars.

Here's a little speed record of

## Peacock Brakes

compared with air brakes. Dry rails. At 10 m.p.h., with a car weighing 31,360 lb., a light air-brake, service application, at 61 lb. pressure, stopped the car in 4.1 seconds and 29.67 ft.

The PEACOCK was applied for 2.3 seconds. It stopped that car in 4 seconds and 28.33 ft.

Official Score (from official test records), 1.34 ft. and 0.1 second (actual stopping time) favor PEACOCK.

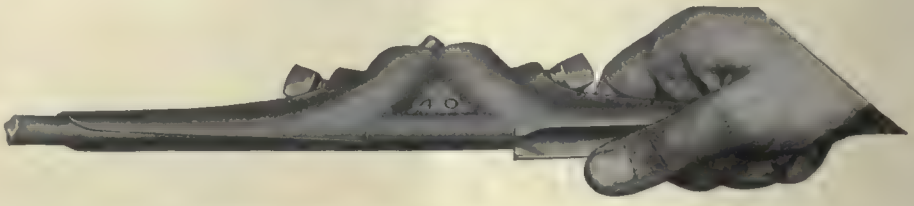
It's how you **apply** the power, gentlemen!

The Eccentric Drum

## National Brake Co.

Buffalo, N. Y.

# Economize on Splicers by using SAMSONS



Note the smooth under-run. That's what every maintenance man appreciates. It's all due to the lugs cast on the inside of the lips—an exclusive patented Drew feature. When the wire is clinched, the notch made by the bend in the wire is completely filled. There can be no gap —no bump—no arc. That's one reason "Samsons cost less per car mile."

*On your next requisition specify Samsons*
*and get this benefit. Full details on request.*

**DREW ELECTRIC & MFG. CO.**
**Offices and Works: Indianapolis, Ind.**
Representatives in principal cities.

*Drew Overhead Line Material Is Standard on Keenly Managed Roads*
*Get Quotations*

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# *BUCKEYE SPLICING TAPE*

**No better insulating tape —Not affected by extreme temperatures**

**Permanent fabric strength and lasting adhesiveness**

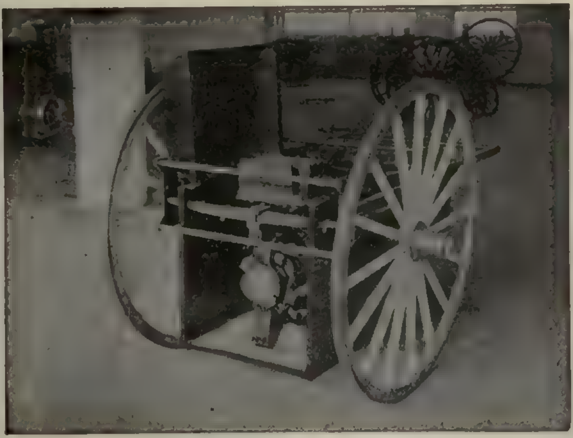
*"Where Quality Counts"*

## *IN THE RAILWAY and CONTRACTING FIELD*

There must be quality in each essential part to make a complete quality whole—reliable tape—friction or splicing—means a dependable finished splice.

Are you experimenting, or using a brand of tape upon which you can rely for service?

***The Mechanical Rubber Co.*** ***Cleveland, Ohio***



## Your cars will never know when the Lincoln Bonder is taking energy from the line

Because of the very small amount of energy required to apply a Lincoln Bond in the Lincoln motor-generator way, and

Because of the very small amount of time (less than a minute) to apply a Lincoln Bond in the Lincoln motor-generator way.

Therefore, your car motors and car lights are never disturbed by line fluctuations—

Nor is your car service interrupted by the use of an outfit which can be swung on and off between short-headway cars.

## The Lincoln Bonding System

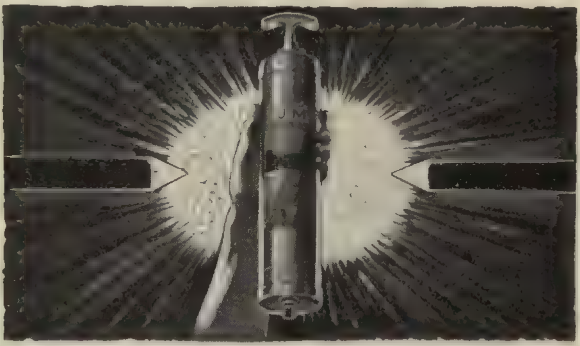
### is decidedly worth your early investigation

A true Integral Weld made in the shortest time at minimum cost and without resistance losses.

**The Lincoln Bonding Co.**
**636 Huron Road, Cleveland, Ohio**

AGENTS:

LEWIS & ROTH COMPANY
1012 Liberty Bldg., Philadelphia, Pa.
519 W. 38th St., New York City, N. Y.
CHARLES N. WOOD COMPANY
14 Federal St., Boston, Mass.
HOLDEN & WHITE, Inc.
343 S. Dearborn St., Chicago
W. C. BURDICK
808 First Nat'l Bank Bldg., Milwaukee, Wis.
W. H. ELLIOT
Chattanooga, Tenn.



## SAFE, even when fighting high voltage arcs—

## JOHNS-MANVILLE FIRE EXTINGUISHER

Here are the results of tests made by a large Central Station electrical laboratory:

| | Spark at | Arc Maintained at |
|---|---|---|
| Transil Oil | 26,000 volts | 38,000 volts |
| J-M Extinguisher Fluid | 31,000 volts | 41,500 volts |

(Electrodes immersed in liquid, spaced 0.2 inches between points.)

Simply another proof of the high resistance of Johns-Manville Extinguisher Fluid—and another argument for the use of this fire extinguisher around arcs of high potential.

From a mechanical standpoint, too, the Johns-Manville Fire Extinguisher excels, because of its two-way method of operation—an exclusive feature. Can be discharged either by pumping or by air pressure previously pumped up and temporarily stored—hence will master the tight-corner fires where there's no elbow room for pumping. Smothers any incipient blaze without damage to machinery or instruments.

The Johns-Manville Fire Extinguisher is inspected, approved and labeled by the Underwriters' Laboratories, Inc.

JOHNS-MANVILLE SERVICE
COVERS THE CONTINENT

*Serves more people in more ways than any other Institution of its kind in the world*

**H. W. JOHNS-MANVILLE CO.**
NEW YORK CITY
**10 Factories—Branches in 55 Large Cities**

**MACHINE TOOLS**

**For Electric Railway Repair Shops**

WE are in a position to furnish complete machine tool equipment for electric railway repair shops, including steam hammers and electric traveling cranes.

*Correspondence Invited.*

Car Wheel Presses, 200 to 600 Tons Capacity

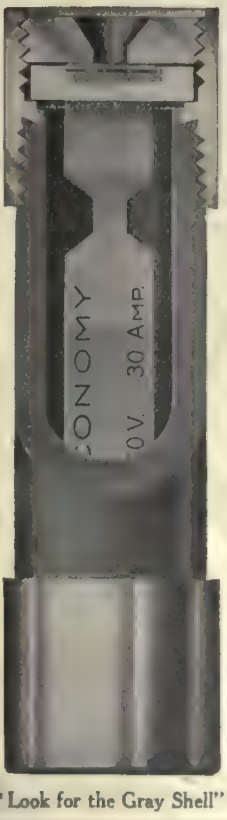
**NILES-BEMENT-POND CO.**

GENERAL OFFICES, 111 BROADWAY, NEW YORK

Boston, Philadelphia, Pittsburgh, Cleveland, Cincinnati, Birmingham, Detroit, Chicago, St. Louis, San Francisco

***Isn't a Saving of 80% a year in fuse costs (with safety) worth while?***

SAFETY FIRST ECONOMY renewable cartridge FUSES



"Look for the Gray Shell"

**That's what the use of**

**ECONOMY Renewable Cartridge FUSES**

is effecting for users who previously used the non-renewable type.

Why throw away a fuse when it has blown? It's a waste that can be avoided. Economy renewable fuses will save you 80% of that wasted expense. Thousands of users—millions in use.

Write for Catalog 17 and free samples, stating the capacity and voltage desired. We want every electric railway to try them.

**ECONOMY FUSE & MFG. COMPANY**

Kinzie and Orleans Sts., Chicago

# EMB Grid Resistors

## ARE MADE RIGHT AND STAY RIGHT

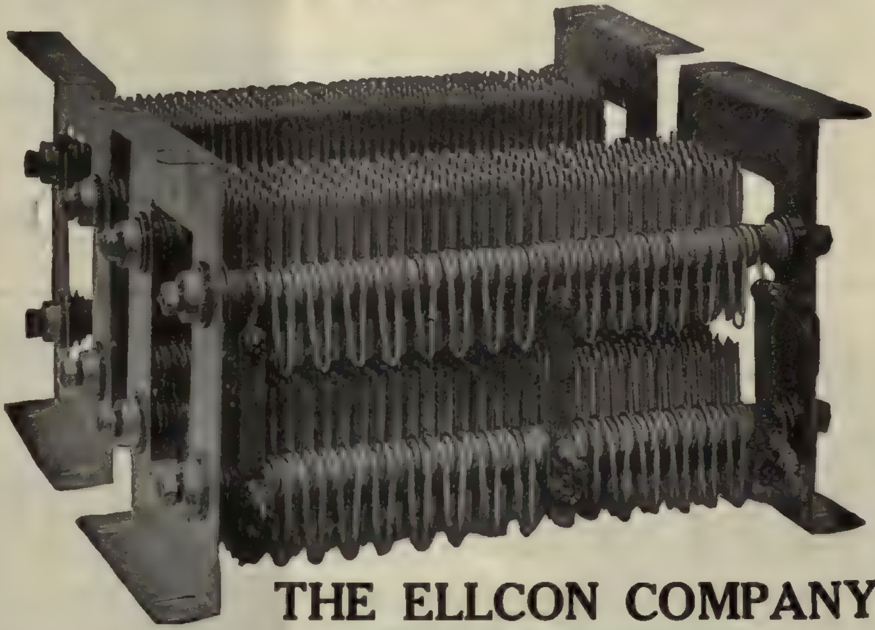
No resistors get more abuse than those under a car.

They are abused electrically by careless operation of the controller.

They are abused mechanically by exposure to dusty, muddy and stone-littered streets.

Until the arrival of E M B drawn, non-corroding grid resistors, troubles from these sources seemed unavoidable.

E M B grid resistors actually have made this part of your equipment troubleproof.



**THE ELLCON COMPANY**
**50 Church Street, New York**

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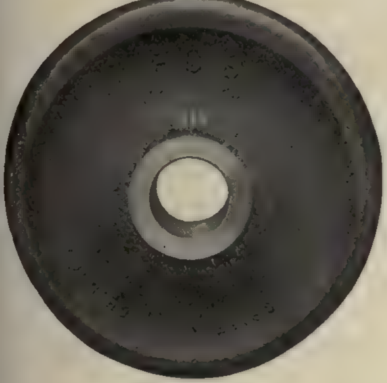
# THE GRIFFIN F. C. S. WHEEL



## is an improved Chilled Iron Wheel

Their constant use on a large number of street and interurban railways throughout the country demonstrates their superior qualities.

The chilled tread surface contains three and one-half per cent carbon white iron—is harder than tool steel and capable of long wear.

All of our foundries have adequate facilities for promptly refitting wheels and axles.

Our large output insures prompt deliveries.

## GRIFFIN WHEEL COMPANY

**McCormick Building, Chicago, Ill.**

FOUNDRIES

**Chicago Detroit Boston Los Angeles Denver St. Paul Tacoma Kansas City**

The new high speed interurban cars recently placed in service by the Jamestown, Westfield & Northwestern Railroad are fitted with Standard No. 1062 rolled steel wheels mounted on Standard axles.
—*Representative practice*

SS BRAND

STANDARD
STEEL WORKS CO.
Morris Building Philadelphia

New York
Chicago
St. Louis
Pittsburgh
San Francisco
Richmond

Portland
Havana, Cuba
London, Eng.
Melbourne, Aust.
Monterey, Mex.
Mexico City

**Steel for Service**

Extract from letter written by Chief Engineer of Pittsburgh & Conneaut Dock Company:—

"Referring to the attached letter dated November 30th, regarding service of the Carnegie Steel Company's rolled steel wheels, wish to advise that our records show that we commenced using these wheels in 1911. Previous to that time we used rolled steel tires on cast iron centers, and the ordinary cast iron, chilled, double flanged wheel. We have found in our service, which I would class as **very severe,** that the rolled steel wheel has given us uniform satisfaction. These have proven superior to the rolled steel tire, on account of expense and durability. The failure of the rolled steel tire has been due to stretching, due to the rolling action, thereby loosening it from the cast iron center. We have had a great deal of difficulty with the chilled wheel, on account of its lack of uniformity in chill; the soft spots giving away under our excessive loads, which are in some cases as high as 55,000 lbs. under moving load. **The steel wheels have shown wonderful uniformity in density, and a great durability,** on account of strength of flange. We have worn the flanges very thin, but **in no case have we had a flange break,** which has been contrary to our experience with chilled wheels. I should consider it quite a hardship if we were obliged to go back to the cast iron chilled wheel, on account of the difficulties mentioned above."

Although the above letter was written in connection with Crane Track Wheels in heavy industrial service,

**Carnegie Rolled Steel Wheels**

give the same service on electric railways.

The mark of quality It protects the user

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General Offices—Pittsburgh, Pa.

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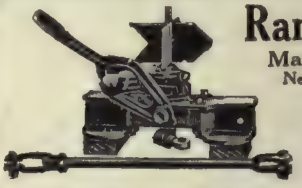

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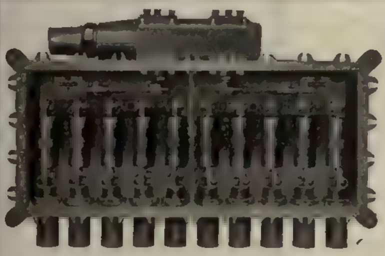

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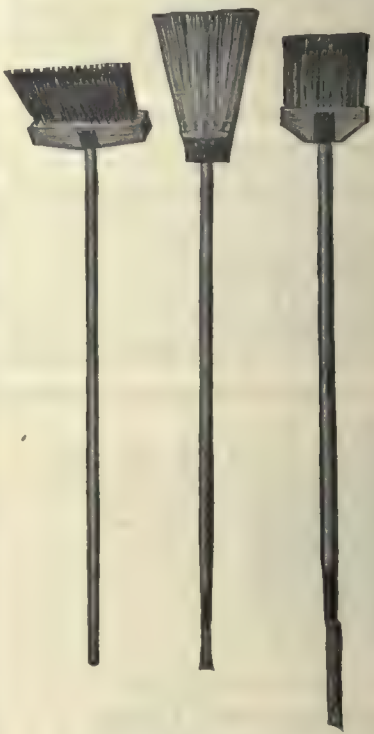

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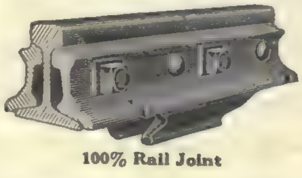

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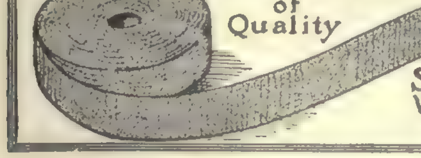

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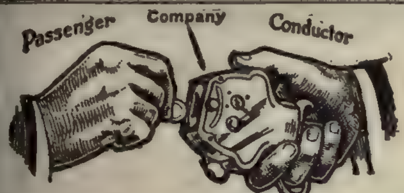

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for Monitor and Arch Roof Cars, and all classes of buildings; also
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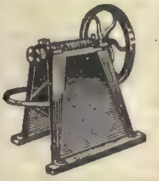

Saved from the Ashes as many tickets are, means nickels loss to you. Avoid the risk.

Patten Ticket Destroyer is used right in the office under the eyes of trustworthy employes.

It mutilates beyond redemption.

Scrap sold will pay for the machines.

*Ask us for Circular J.*

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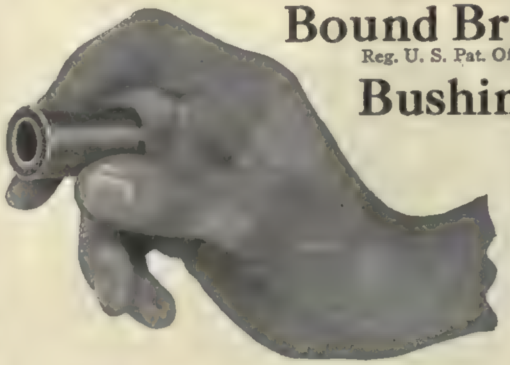
## A Recessed

Trade Mark
**Bound Brook**
Reg. U. S. Pat. Off.
**Bushing**



This is a close-up of a Bound Brook trolley wheel graphite bushing, showing the neat groove recessed in each end for the insertion of graphite to take care of any end thrust. The graphite placed in these recesses goes through the same careful course of thorough preparation, as the graphite within the casting.

All genuine graphited "Oil-less" Bearings have always been made at Bound Brook, N. J., in the United States of America, by the

**Bound Brook Oil-less Bearing Co.**
FORMERLY
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have always been made of entirely new metal, which accounts for their long life WITHOUT INJURY TO THE WIRE. Do not be misled by statements of large mileage, because a wheel that will run too long will damage the wire. If our catalogue does not show the style you need, write us—the LARGEST EXCLUSIVE TROLLEY WHEEL MAKERS IN THE WORLD.

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**KALAMAZOO, MICH., U. S. A.**

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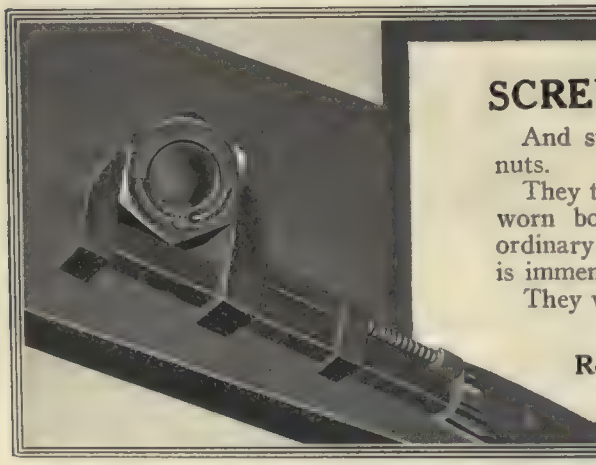

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And stops—Roller Lock Nuts are the *only* self-tightening nuts.

They take up the stretch—they are fool proof—they lock on worn bolts just as well as new—they cost no more than ordinary devices and the ultimate saving in labor and renewals is immense.

They will add materially to the life of your cars.

Get our literature now.

**Roller Lock Nut Co., 61 Broadway, New York City**

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The Standard for Speed, Accuracy, Durability

## B-V Visible Punch

Look for this
B-V.
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124 Chambers Street, New York City
Factory, Newark, N. J.

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**KINNEAR** Steel Rolling Doors
FOR CAR HOUSES

Compact, Durable, Easily and Speedily Operated and Fireproof. Openings of any size may be equipped and the doors motor-operated if desired. Manufactured by the
KINNEAR MANUFACTURING CO., Columbus, Ohio
BOSTON PHILADELPHIA CHICAGO

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"GLOBE" The Universal Ventilator

**Globe Ventilator Co., Troy, N. Y.**

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Use them in your terminals—
**PEREY TURNSTILES**
**or PASSIMETERS**
*Faster than the ticket seller*
**Perey Manufacturing Co., Inc.**
30 Church Street, New York City

*Get away from unreliable batteries*

## The Consolidated Buzzer System

operates directly from the line and always gets plenty of juice. No metal is exposed to the passenger's touch.

The only dependable system.

**Consolidated Car-Heating Co.**

New York Albany Chicago

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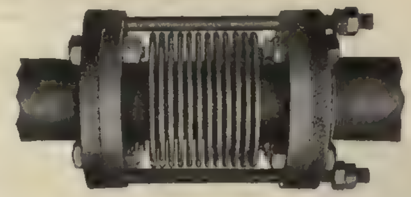
# NUTTALL



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The Nuttall Joint is made to accommodate high and low pressure lines, allowing a total movement of 2" and ⅝" respectively.

**NUTTALL**
**PITTSBURGH**

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*Ball Bearings for heavy loads*

For heavy loads Gurney Bearings are best because they have larger load capacities than any other ball bearings that money can buy. This gives a larger factor of safety and longer life.

*To save coal, install ball bearing equipment.*

*To insure reliable operation specify Gurney Bearings.*

171

# GURNEY BALL BEARINGS

**Gurney Ball Bearing Co.**

Conrad Patent Licensee

Chicago, Ill.
Jamestown, N. Y.
New York City

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## Ventilation—Sanitation—Economy—Safety

*All Combined in*

**The Cooper Forced Ventilation Hot Air Heater**

*Patented September 30, 1913. Ask for the full story*

We also Manufacture Pressed Steel Hot Water Heaters

THE COOPER HEATER CO. CARLISLE, PA.

---

HEATING AND VENTILATING YOUR CARS is the problem to-day. Let us show you how to do both with one equipment. Now is the time to consider this change before you start your cars through the shops for overhauling. Kill two birds with one stone.

**THE PETER SMITH HEATER COMPANY**

1759 Mt. Elliott Ave., Detroit, Mich.

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# STUCKI SIDE BEARINGS

are truly frictionless. The roller instead of turning on a pin rolls freely like a rolling pin.

**A. Stucki Co.**

Oliver Bldg.
Pittsburgh, Pa.

"Zero" AND "Motor"

STANDARD for a THIRD of a CENTURY

The Mileage Babbitt

Post's ZERO and MOTOR metals have been standard for a third of a century in shops where mileage records are attained. Nothing but highest grade of virgin raw materials used.

*Write us for details.*

E. L. Post & Co., Inc., Sole Mfrs., 50 Cliff St., New York City

The American Trade Mark represents a guarantee of Satisfactory Service. ALL MOTOR AND GENERATOR BRUSHES recommended by us are covered by that guarantee.

AMERICAN CARBON & BATTERY CO. E. ST. LOUIS, ILL.

LONGWEAR BUSHINGS
For Brake Gear

Hardened
Steel
Accurate
Uniform

also
LONGWEAR
BRAKE PINS
to
Specifications

E.G. Long Company
50 Church Street New York

**MASON SAFETY TREADS**—prevent slipping and thus obviate damage suits.

**KARBOLITH CAR FLOORING**—for steel cars is sanitary, fireproof and light in weight.

**STANWOOD STEPS**—are non-slipping and self-cleaning.

Above products are used on all leading railways. For details address

AMERICAN MASON SAFETY TREAD CO.
Main Offices: Lowell, Mass.
Branch Offices: Boston New York City, Chicago, Philadelphia, Kansas City, Cleveland, St. Louis.

UNIVERSAL ANTI-SLIP TREADS
cars and station steps.

Universal Safety Tread Company
Waltham, Mass.

"Boyerized" Products Reduce Maintenance

Bemis Trucks
Case Hardened Brake Pins,
Case Hardened Bushings
Case Hardened Nuts and Bolts
Manganese Brake Heads
Manganese Transom Plates
Manganese Body Bushings
Bronze Axle Bearings

Bemis Pins are absolutely smooth and true in diameter. We carry 40 different sizes of case hardened pins in stock. Samples furnished. Write for full data.

Bemis Car Truck Co., Springfield, Mass.

S-W Shim Slack Adjusters Save Brakeshoes and Labor

SMITH-WARD BRAKE COMPANY, Inc.
17 Battery Place, New York

UNION SPRING & MFG. CO.
SPRINGS
COIL AND ELLIPTIC
M. C. B. Pressed Steel Journal Box Lids
General Office: First Nat'l Bank Bldg.
PITTSBURGH, PA.
Works: New Kensington, Pa.
50 Church St., New York. 1204 Fisher Bldg., Chicago, Ill.
Missouri Trust Bldg., St. Louis, Mo.

The "Hycap-Exide" Battery
for
STORAGE BATTERY STREET CARS
THE ELECTRIC STORAGE BATTERY CO
PHILADELPHIA

# SEARCHLIGHT SECTION

### FREQUENCY CHANGERS

4 1000 KW. SETS:
Generators: 3 ph., 60 cy., 4500-2300 volts, 300 RPM.
Motors: 1050 Kva., 3 ph., 25 cy., 6600 volts, 300 RPM.
Exciters: Direct connected.
Switchboards: With necessary instruments.

1 100 KW. SET:
Generator: Sgle. ph., 60 cycle, 2300 volts, 720 RPM.
Motor: 150 HP., 3 ph., 25 cy., 2300 volts, 720 RPM.
Exciter: 5 KW., direct connected.

### ROTARY CONVERTERS AND MOTOR GENERATOR SETS—25 Cycles

1 600 KW. Gen. Elec., TC-A, 3 ph., 600 volt, D.C., 375 volt A.C., 8 pole, 375 RPM.

1 1000 KW. set consisting of 1000 KW. 16 pole generator. 275 volts, 3636 amp., dir. conn. to 1050 KW. synchronous motor, 3 ph., 25 cy., 6600 volts, 250 RPM.

1 600 KW. set consisting of two 300 KW. 6 pole generators, 550 volts, 600 amps., dir. conn. to one 750 HP. synchronous motor, 3 ph., 25 cy., 6600 volt, 500 RPM., complete with AC and DC panels.

4 500 KW. Gen. Elec., HC-K, 600 volt D.C., 4 pole, 750 RPM., each rotary complete with three 165 Kva. Gen. Elec. OI SC Transformers, HP-RP, 6600/5940 volts prim., 430/286/143 volts sec., also necessary panels and instruments.

1 500 KW. Westg., 3 ph., 550 volt D.C., 390 volt A.C., 6 pole, 500 RPM., with dir. conn. starting motor AC and DC panels and three 175 KW. Westg. oil cooled transformers, 13,200 volts prim., 390 volts sec.

### ROTARY CONVERTERS—60 Cycles

1 300 KW. Westinghouse, 525-575 volts D.C., 600 RPM., with two 165 KW. Westg. oil insulated transformers, 2200 volts primary, 367 volts secondary.

2 300 KW. Gen. Elec., type HC, form P, 8 pole, 3 ph., 60 cy., 600 volts D.C., 900 RPM. With each rotary there are three 110 KW. Gen. Elec. AB form B1 transformers. 13,200 volts primary, 430 volts sec., also panels with necessary instruments.

*Our new and complete list of steam and electrical equipment will be mailed upon request*

**MACGOVERN & COMPANY, Inc.**
**114 Liberty Street, New York City**

## FOR SALE

8—Brill No. 21 Single Trucks.

8—250 hp. Stirling Boilers, equipped with Murphy Stokers.

151—Open Car Bodies, 31 equipped with Tomlinson Couplers, Storage Air Brakes, and Dupont Trucks.

Write for full particulars to

**Purchasing Dept.**
**DETROIT UNITED RY.**
**Detroit, Mich.**

## FOR SALE

### MOTORS

4—W. H. 38-B **Motors**, complete with gears, pinions and gear casings.

12—W. H. 68 **Motors**, complete with gears, pinions and gear casings.

8—G. E. 80 **Motors**, complete with gears, pinions and gear casings.

90—G. E. 67 **Motors**, complete with gears, pinions and gear casings.

12—G. E. 73 **Motors**, complete with gears, pinions and gear casings.

### CONTROLLERS

12—W. H. K-6 **Controllers.** 20—K-11 **Controllers.**
30—K-10 **Controllers.** 10—K-28-B **Controllers.**

### COMPRESSORS

25—AA-1 **Air Compressors.**

### GEARS

51—Solid Gears, 68 teeth, 3⅞" rough bore, machined from Carnegie rolled steel blanks, standard hub, for W. H. 12-A, 68, 56 and 49 Motors. Can be bored for 4½" axle.

### LATHE

1—Pond Car Wheel **Lathe**, motor driven.

**For further particulars apply to**

**W. R. KERSCHNER COMPANY, INC.**
**50 Church Street, New York, N. Y.**

## IMMEDIATE SHIPMENT

1—500 KW. General Electric Curtis steam turbine, 3 ph., 60 cy., 1800 rpm., 2300 volts, 150 lb. steam pressure, vertical type.
1—500 K.W. Westinghouse Horizontal Turbo Generating Unit wound for 3 phase, 60 cycle, 2300 volts, speed 3600 rpm., condensing duty.

### 25 Cycle Rotary Converters

2—150 KW. General Electric type T.C., 4-150-750, 25 cycle, 3 ph., 575 volt, rotary converters, 750 rpm., complete with end play and speed limit device.

### 200 Kilowatt 60 Cycle Rotary Converters

1—200 KW. Westinghouse 3 ph., 60 cy. rotary converters, 550 volts, 720 rpm., complete with 4—100 KW. Westinghouse Scott connected oil insulated transformers, 10,000/9500 volts prim., 430/362 volts secy.
1—150 KW. Westinghouse 3 ph., 60 cy., rotary converter, 550 volts, 720 rpm.

### Transformers

6—750 KVA. General Electric oil filled self cooled transformers, 4400/281 volts, with 4400-4290-4180-4070-2200-2090-1980 taps in the primary.
3—500 KW. General Electric, 60 cy., single phase transformers, 66,000 volts primary, 4400/2200 volts secondary.
3—375 KVA. Allis Chalmers O. I. S. C. indoor type transformers, 25 cy., 2300 v., 367 v. secy.
3—350 KVA. General Electric, type H, 60 cy., transformers 2400/2300/2200 v. prim., 200/400 v. secy.
1—100 KVA. General Electric, type H, 60 cy. transformer, 4600 volts prim., 115-230 volts secy.
4—100 KW. Westinghouse, oil insulated, Scott connected transformers, 10,000/9500 v. prim., 430/362 v. secy.
3—75 KW. Westinghouse 60 cy. transformers, 2200 v. prim., 110/220/440 v. secy.
3—50 KVA. General Electric type H, 60 cy. transformers, 900/1000/16000 v. prim. Y., 230/460 v. secy.
Also a stock of smaller sized transformers.

**IMMEDIATE DELIVERY**

**ARCHER & BALDWIN, Inc.**
**114-118 Liberty Street New York City**
**TELEPHONE 4337-4338 RECTOR**

# SEARCHLIGHT SECTION

## *Get your Wants into the Searchlight*

### ADVERTISING RATES

Under "Positions Wanted," including Salesmen looking for new connections, Evening Work Wanted, etc., undisplayed advertisements cost **three cents a word,** minimum charge 50 cents an insertion, **payable in advance;** less 10% if one payment is made in advance for 4 continuous insertions.

Under "Positions Vacant," including Agents and Agencies Wanted, Representatives Wanted, Salesmen Wanted, Partners Wanted, Business Opportunities, Employment Agencies, and Miscellaneous For Sale, For Rent, and Want ads; also Auction Notices, Receivers' Sales, Machinery and Plants For Sale or Wanted, undisplayed advertisements set solid in one paragraph, cost **five cents a word,** minimum charge $1.50 an insertion.

Machinery advertisements (undisplayed) set with a paragraph for each item, or tabulated, 30 cents a line, minimum 5 lines.

If replies are in care of any of our offices, allow five words for the address.

All advertisements for bids (Proposals) cost $2.40 an inch.

### ADVERTISEMENTS IN DISPLAY TYPE

cost as follows for sin3le insertions:

| | | | |
|---|---|---|---|
| $\frac{1}{16}$ p. ($1\frac{1}{8}$x$3\frac{3}{8}$ ins.) | $5.00 | 1 in. (1x$2\frac{3}{16}$ ins.) | $3.00 |
| $\frac{1}{8}$ p. ($2\frac{3}{8}$x$3\frac{1}{8}$ ins.) | 10.00 | 4 inches (4x$2\frac{3}{16}$ ins.) | 11.60 |
| $\frac{1}{4}$ p. (5x$3\frac{3}{8}$ or $2\frac{3}{8}$x7 ins.) | 20.00 | 8 inches (8x$2\frac{3}{16}$ ins.) | 22.40 |
| $\frac{1}{2}$ p. ($10\frac{1}{4}$x$3\frac{3}{8}$ or 5x7 ins.) | 40.00 | 15 inches | 40.50 |

For space to be used within one year, to be divided to suit requirements of advertiser, provided some space is used at least once a month following first insertion:

| | | | |
|---|---|---|---|
| 1 page | $80 a page | 18 pages | $56 a page |
| 3 pages | 72 a page | 26 pages | 52 a page |
| 6 pages | 64 a page | 32 pages | 50 a page |
| 9 pages | 62 a page | 40 pages | 48 a page |
| 12 pages | 58 a page | 52 pages | 45 a page |

In replying to advertisements, do NOT enclose original testimonials, or anything that you may want returned. State your qualifications in as concise and neat a manner as you can and enclose COPIES of testimonials. In machinery ads, use a local name or address if possible so that readers can wire direct and get quick replies.

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## MISCELLANEOUS WANTS

### Wanted at Once

For immediate shipment any quantity of battery lead plates, sediment scrap copper and wire, brass and all other grades of scrap material. Write to us today for our prices. National Metal & Rubber Co., 31 India Wharf, Boston, Mass.

## POSITIONS WANTED

AS superintendent, train master or chief train dispatcher, with a good interurban company. 17 years' experience in operating department of electric and steam railways. Best reference. P. W. 1542 (Utah), Elec. Ry. Journal, San Francisco.

AUDITOR, secretary or treasurer of interurban road; 15 years' experience; fully acquainted interstate commerce commission requirements; furnish excellent references and bond as required. (Ind.) PW1574, Elec. Ry. Journal, Chicago.

COPPER zone fare collection. I have successfully handled this system for three years, and can do the same for you. Get a specialist and anticipate your needs. (Conn.) PW1565, Elec. Ry. Journal, N. Y. C.

ENGINEER executive desires position as manager of public utility. Technical graduate, 15 years' experience engineering, operating and executive positions. Good record and references. P. W. 1555, (Ill.) Elec. Ry. Jour., Chicago.

## POSITIONS WANTED

EXECUTIVE position wanted with industrial or public utility company by graduate electrical engineer. Extensive railway, power and lighting experience and public utility valuations. Age 39. (N.Y.) PW1561, Elec. Ry. Journal, N. Y. C.

MAN, 45, with 25 years' accounting, traffic and operating experience, last 8 years' traffic and general manager small railroad, desires position with electric line. P. W., 1554 (Wis.), Elec. Ry. Journal, Chicago.

MAN of 43, with 17 years' experience in executive railway and lighting work with important company in city of 300,000. Five years as secretary and five years in legal and claim work. Unquestionable references. (Del.) PW1566, Elec. Ry. Journal, Philadelphia.

MASTER mechanic with 18 years' experience on high speed interurban and city, wishes to change position. Entirely competent to handle property and help and get good results; not afraid of a tough proposition. P. W., 1521 (Conn.), Elec. Ry. Journal.

OPERATING man with fifteen years' successful experience along very economical lines open for engagement as manager or superintendent, steam or electric. (Cal.) PW1575, Elec. Ry. Journal, San Francisco.

SHOP foreman, married, 35, long practical experience; inspector, overhauling, all equipments, system, economy, wants to change. PW 1557 (Ohio), Elec. Ry. Journal, Chicago.

## POSITIONS WANTED

SUPERINTENDENT, who has come up through the ranks. Have been successful as trainman dispatcher, superintendent of transportation and overhead; 40 years of age, with present company 1 years. Desirous of making a change. (Ohio) PW1564, Elec. Ry. Journal, Cleveland.

## POSITIONS VACANT

ARMATURE winder and electrician familiar with general maintenance and capable of taking charge of rolling stock, small road, twelve cars. Give experience and salary. Married man preferred. P., 1531 (Mich.), Elec. Ry. Journal, Chicago.

DRAFTSMAN wanted for Master Mechanic's office. Must have good electrical and mechanical knowledge. State salary expected. Man over 31 years old preferred. P. 1544 (Pa.), Elec Ry. Journal, Philadelphia.

## EMPLOYMENT AGENCIES

### Correspondence Service

The undersigned provides a confidential service designed to locate openings through correspondence for men earning not less than $2,500 and up to $25,000; all lines. Not an employment agency, but a constructive, initiative service, covering individual negotiations. Established 1910. Complete privacy assured; present connections in no way jeopardized. Send name and address only for explanatory details. R. W. Bixby, H1 Niagara Square, Buffalo, N. Y.

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# If there is anything you want—

or something you don't want that *other* readers of this paper can supply—or use—advertise in the

## Searchlight Section

*NOW*— is the time to offer good second-hand equipment or machinery for sale. The demand is great for good plant for immediate delivery. That's why you should advertise NOW.

*NOW*— or any other time, use the Searchlight Section for advertising

Agencies Wanted
Agents Wanted
Auction Notices
Buildings For Sale
Business Opportunities
Civil Service Opportunities
Contracts To Be Let
Contracts Wanted
Educational Courses
Employment Agencies
Exchanges
For Rent Items
Franchises
Industrial Sites
Miscellaneous Wants
New Industries Wanted
Partners Wanted
Patents For Sale
Patent Attorneys
Plants For Sale
Positions Vacant
Positions Wanted
Property For Sale
Receivers' Sales
Representatives Wanted
Salesmen Wanted
Work Wanted
Etc., Etc., Etc.

# SEARCHLIGHT SECTION

## Immediate Shipment

100 tons of 62 lb. Shanghai rails, together with bars, rails practically as good as new, ready for quick shipment. Wire for prices.

**M. K. FRANK**
**Frick Building, Pittsburgh, Pa.**

---

FOR SALE

## ONE TURNTABLE

We have for immediate shipment one 12′ diameter turntable for turning single truck one-end cars, gauge of track on same 4′ 8½″. Price $250.

**Charlottesville & Albemarle Ry. Co.**
Charlottesville, Va.

---

## IMMEDIATE SHIPMENT

1—300 K.W. Westinghouse, compound wound, 3 bearing, belt-driven

## Generator

speed 435 R.P.M., 550 volts.

**LEO A. PHILLIPS**
Steam & Electrical Equipment
90 West Street New York City

---

## 85 lb. A. S. C. E. Relayers

16,000 tons—with Angle Bars to match. Available immediate shipment and centrally located.
We positively own these Rails and offer same in carload lots and over.
25,000 tons—Relayers—sizes 25 lb. to 100 lb., in stock our Pittsburgh yards and vicinity.
Immediate shipment guaranteed and prices very attractive.
Carload and less than carload inquiries and orders solicited.
Rails cut to length for structural purposes.
Frogs, Switches, Bolts, Nuts, Spikes and all Accessories.

**L. B. FOSTER COMPANY**
Park Bldg. Pittsburgh, Pa.

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**CLEVELAND ARMATURE WORKS**
Cleveland, Ohio

## Everything in the Line of Repairs to Electrical Machinery

Complete Armatures, New Armatures, Rewound Armature Cores, Armature Shafts, Armature Coils, Fields and Commutators.

Established 22 Years.

---

## CAR BARGAINS

**OPEN and CLOSED**
**MOTOR and TRAIL**

*Write for Price and Full Particulars to*

**ELECTRIC EQUIPMENT Co.**
601 Commonwealth. Bldg. Phila Pa

---

FOR SALE

## Overhead Steel Bridge

Skew 63° 8′. Designed for two 60-ton Interurban cars. Main span of two through plate girders 53 feet long supported on four channel columns. Approaches of four 24″ 80-lb. I-beams, average length 29 ft. 6 in. Will sell entire bridge or any separate member.

**Indiana Railways & Light Company**
Kokomo, Indiana.

---

FOR SALE

## Three Cars and Motor

We have for immediate delivery 3 8-bench single truck, open cars in good condition, equipped with G.E. 800 motors, Form K controllers; also registers, gauge 4 ft. 8½ in. Price $500 each f.o.b. Charlottesville, Va.

We also have one 7½ hp., 1500 r.p.m., 550-v, General Electric, D.C. motor, with starter, base and pulley, like new. Price $100.

**Charlottesville & Albemarle Ry. Co.**
**Charlottesville, Va.**

---

FOR SALE

## Westinghouse Air Brake Parts

Four ½-in. P. V. brake valves, four gauges registering from 10 to 100 pounds (⅜-in. pipe), four 20-in. x 48-in. air tanks. Also three Westinghouse air connecting couplers, complete. All practically new.

**K. C. KAW VALLEY & W. RY. CO.**
**Bonner Springs, Kan.**

---

FOR SALE

Four, 65 H.P., Type 302, Allis-Chalmers.

## Railway Motors

NEW—HAVE NEVER BEEN USED with Gears, Pinions, Cases, Axle Bearings, Etc.

ALSO

## Two Passenger Trail Cars

In Fine Condition, Used Very Little, Seating Capacity 50, Completely Equipped.

QUICK SHIPMENT.

**The Arkansas Valley Int. Ry.**
**Wichita, Kan.**

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## *Get your Wants into the Searchlight*

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**IMMEDIATE SHIPMENT**

- 1—100 KW. 250 V.D.C. Steam Engine Generator set.
- 1—37½ KW. 250 V.D.C. Steam Engine Generator set.
- 1—60 KW. 250 V.D.C. Gas Engine Generator set.
- 1—17½ KW. 125 V.D.C. Gas Engine Generator set.
- 1—62 KW. 500 V.D.C. Gas Engine Generator set.
- 1—90 KW. 500 V.D.C. Gas Engine Generator set.
- 1—500 KW. 550 V.D.C. Generator belted to Synchronous motor, 2200 V., 3 ph., 60 cy.
- 1—150 HP. 2200 V. 900 RPM. 3 ph., 60 cy., new induction motor.
- 2—75 HP. 440 V., 860 RPM, 3 ph., 60 cy., new induction motor.
- 1—50 HP. 220 V., 575 RPM, 3 ph., 60 cy., new induction motor. Complete stock of smaller A.C. & D.C. motors.

If you are not on our mailing list—write us. We will gladly send you a copy of our latest list of apparatus—in stock.

**DUQUESNE ELECTRIC & MFG. CO.**
**Bessemer Bldg. Marshall Bldg.**
**Pittsburgh, Pa. Cleveland, Ohio**

---

## FOR SALE

3—Three phase 33,000 volt electrolytic lightning arrester equipments complete with horn gaps, pipe frame, etc. Weight 4500 lb.

8—High tension current transformers, oil cooled GE type S, form K-11, cycles, 25/125, 45,000 volts, amperes 20/40, ration 4/8 to 1, weight 370 lb.

5—Triple pole, single throw, high tension oil break switches, remote control, indoor type, GE type F, Form K-10, 300 amp. 45,000 volts. Weight 3500 lb.

**TEXAS ELECTRIC RAILWAY**
**Dallas, Texas**

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## Tanks

### Want 40

The bigger the better

(Mo.) W 1563, Elec. Ry. Journal,
Chicago.

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WANTED
Second hand light

## Trenton Line Tower

with raising apparatus. Wagon not wanted. State condition and terms.

**Hudson River & Eastern Traction Company**
Ossining, N. Y.

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## RAILS

**SHANGHAI**
500 ton 6-in. 60 lb. Relay. Good.

**GIRDER RAIL**
38 ton 7 in. 114 lb. Grooved Girder. New

**NEW WITH ANGLES**
200 ton 55 lb. A S CE.
1500 ton 60 lb. A S CE. Good as new.
230 ton 67 lb. 184 ton 90 lb. new
2000 ton 67½ lb. 335 ton 94 lb.
62 ton 85 lb. new 650 ton 100 lb.

If what you want is not listed here, write or wire us.

**Machinery Cars Equipment**

**ZELNICKER IN ST. LOUIS**

*Have you seen our new Bargain Bulletin?*

# WHAT AND WHERE TO BUY

## Equipment, Apparatus and Supplies Used by the Electric Railway Industry with Names of Manufacturers and Distributors

**Acetylene Service and Apparatus.**
Oxweld Acetylene Co.

**Advertising, Street Car.**
Collier, Inc., Barron G.

**Air Cleaners and Rectifiers.**
Horne Mfg. Co.

**Alloys, Steel and Iron. (See also Bearings and Bearing Metals.)**
Titanium Alloy Mfg. Co.

**Anchors, Guy.**
Electric Service Supplies Co.
Holden & White, Inc.
Johns-Manville Co., H. W.
Ohio Brass Co.
Westinghouse Elec. & M. Co.

**Anti-Climbers.**
Railway Improvement Co.

**Automobiles and Buses.**
Brill Co., The J. G.
General Vehicle Co., Inc.

**Axle Straighteners.**
Columbia M. W. & M. I. Co.

**Axles, Car Wheel.**
Bemis Car Truck Co.
Brill Co., The J. G.
Carnegie Steel Co.
National Tube Co.
St. Louis Car Co.
Standard Steel Works Co.
Westinghouse Elec. & M. Co.

**Babbitting Devices.**
Columbia M. W. & M. I. Co.

**Badges and Buttons.**
Electric Service Supplies Co.
International Register Co., The

**Bankers and Brokers.**
National City Co.

**Batteries, Dry.**
Johns-Manville Co., H. W.

**Batteries, Storage.**
Electric Storage Battery Co.

**Bearings & Bearing Metals.**
Bemis Car Truck Co.
Columbia M. W. & M. I. Co.
Eureka Co.
General Electric Co.
Kerschner Co., Inc., W. R.
Long Co., E. G.
More-Jones B. & M. Co.
Post & Co., Inc., E. L.
St. Louis Car Co.
Westinghouse Elec. & M. Co.

**Bearings, Center and Roller Side.**
Baldwin Locomotive Works.
Holden & White, Inc.
Stucki Co., A.

**Bearings, Oilless, Graphite, Bronze and Wood.**
Bound Brook Oil-less Bearing Co.

**Bearings, Roller and Ball.**
Gurney Ball-Bearing Co.
Hess-Bright Mfg. Co.
Railway Roller Bearing Co.

**Bells and Gongs.**
Brill Co., The J. G.
Columbia M. W. & M. I. Co.
Electric Service Supplies Co.
St. Louis Car Co.

**Benders, Rail.**
Niles-Bement-Pond Co.
Zelnicker Sup. Co., W. A.

**Boilers.**
Babcock & Wilcox Co.

**Boiler Cleaning Compounds.**
Dearborn Chemical Co.
Johns-Manville Co., H. W.

**Boiler Coverings.**
Johns-Manville Co., H. W.

**Boiler Tubes.**
National Tube Co.

**Bond Testers.**
American Steel & Wire Co.

**Bonding Apparatus.**
American Steel & Wire Co.
Electric Railway Improvement Co.
Electric Service Supplies Co.
Ohio Brass Co.
Oxweld Acetylene Co.

**Bonds, Rail.**
American Steel & Wire Co.
Electric Railway Improvement Co.
Electric Service Supplies Co.
General Electric Co.
Johns-Manville Co., H. W.
Lincoln Bonding Co.
Ohio Brass Co.
Westinghouse Elec. & M. Co.

**Book Publishers.**
McGraw-Hill Book Co., Inc.

**Boring Tools, Car Wheel.**
Niles-Bement-Pond Co.

**Braces, Rail.**
Kilby Frog & Switch Co.

**Brackets and Cross Arms. (See also Poles, Ties, Posts, Etc.)**
American Bridge Co.
Bates Expanded Steel Truss Co.
Electric Ry. Equip. Co.
Electric Service Supplies Co.
Hubbard & Co.
Lindsley Bros. Co.
Ohio Brass Co.

**Brake Adjusters.**
Holden & White, Inc.
Smith-Ward Brake Co.

**Brake Shoes.**
Amer. Brake Shoe & Fdry. Co.
Brill Co., The J. G.
Columbia M. W. & M. I. Co.
Long Co., E. G.
St. Louis Car Co.

**Brakes, Brake Systems and Brake Parts.**
Bemis Car Truck Co.
Brill Co., The J. G.
Columbia M. W. & M. I. Co.
General Electric Co.
Holden & White, Inc.
Horne Mfg. Co.
Long Co., E. G.
St. Louis Car Co.
Westinghouse Trac. B. Co.

**Bridges and Buildings.**
American Bridge Co.

**Brooms, Track, Steel or Rattan.**
Paxson Co., J. W.
Zelnicker Supply Co., W. A.

**Brush Holders.**
Anderson Mfg. Co., A. & J. M.
Columbia M. W. & M. I. Co.
Eureka Co.

**Brushes, Carbon.**
American Carbon & Battery Co.
General Electric Co.
Jeandron, W. J.
Morgan Crucible Co.
Western Electric Co.
Westinghouse Elec. & M. Co.

**Brushes, Graphite.**
Dixon Crucible Co., Jos.

**Bunkers, Coal.**
American Bridge Co.

**Bushings, Case Hardened and Manganese.**
Bemis Car Truck Co.

**Bushings, Fibre.**
Diamond State Fibre Co.

**Bushings, Graphite and Wooden.**
Bound Brook Oil-less Bearing Co.

**Cables. (See Wires and Cables.)**

**Carbon Brushes. (See Brushes, Carbon.)**

**Car Equipment. (For Fenders, Heaters, Registers, Wheels, etc.—See those headings.)**

**Car Trimmings. (For Curtains, Registers, Doors, Seats, etc. — See those headings.)**

**Cars, Passenger, Freight, Express, etc.**
American Car Co.
Brill Co., The J. G.
Jewett Car Co.
Kuhlman Car Co., G. C.
St. Louis Car Co.
Stephenson Co., John
Wason Mfg. Co.

**Cars, Second Hand.**
Electric Equipment Co.
Kerschner Co., Inc., W. R.

**Cars, Self-Propelled.**
Electric Storage Battery Co.
General Electric Co.

**Castings, Brass, Composition or Copper.**
Anderson Mfg. Co., A. & J. M.
Columbia M. W. & M. I. Co.
Eureka Co.
Frankel Connector Co.
Horne Mfg. Co.
More-Jones B. & M. Co.

**Castings, Gray Iron and Steel.**
Amer. Brake Shoe & Fdry. Co.
American Bridge Co.
American Steel Foundries
Bemis Car Truck Co.
Columbia M. W. & M. I. Co.
Horne Mfg. Co.
Long Co., E. G.
St. Louis Car Co.
Standard Steel Works Co.
Union Spring & Mfg. Co.

**Castings, Malleable and Brass.**
Amer. Brake Shoe & Fdry. Co.
Bemis Car Truck Co.
Columbia M. W. & M. I. Co.
Horne Mfg. Co.
Long Co., E. G.
St. Louis Car Co.

**Catchers and Retrievers, Trolley.**
Electric Service Supplies Co.
Holden & White, Inc.
Horne Mfg. Co.
Kerschner Co., Inc., W. R.
Long Co., E. G.
Ohio Brass Co.
Wood Co., Chas. N.

**Ceiling, Car.—(See Head Lining.)**

**Chemists.**
Little, Inc., Arthur D.

**Circuit Breakers.**
Cutter Electrical & Mfg. Co.
General Electric Co.
Westinghouse Elec. & M. Co.

**Clamps and Connectors for Wires and Cables.**
Anderson Mfg. Co., A. & J. M.
Electric Service Supplies Co.
Frankel Connector Co.
General Electric Co.
Hubbard & Co.
Klein & Sons, Mathias.
Ohio Brass Co.
Westinghouse Elec. & M. Co.

**Cleaners and Scrapers, Track.—(See also Snow-Plows, Sweepers and Brooms.)**
Brill Co., The J. G.
Ohio Brass Co.

**Clusters and Sockets.**
General Electric Co.

**Coal and Ash Handling.—(See Conveying and Hoisting Machinery.)**

**Coasting Recorders.**
Railway Improvement Co.

**Coil Banding and Winding Machines.**
Columbia M. W. & M. I. Co.
Electric Service Supplies Co.

**Coils, Armature and Field.**
Cleveland Armature Works
Columbia M. W. & M. I. Co.
D & W Fuse Co.
General Electric Co.
Independent Lamp & Wire Co.
Westinghouse Elec. & M. Co.

**Coils, Choke and Kicking.**
Electric Service Supplies Co.
General Electric Co.
Westinghouse Elec. & M. Co.

**Coin-Counting Machines.**
International Register Co., The
Johnson Fare Box Co.

**Commutator Slotters.**
Electric Service Supplies Co.
General Electric Co.
Westinghouse Elec. & M. Co.
Wood Co., Chas. N.

**Commutator Truing Devices.**
General Electric Co.
Jordan Bros., Inc.

**Commutators or Parts.**
Cameron Electrical Mfg. Co.
Cleveland Armature Works
Columbia M. W. & M. I. Co.
Eureka Co.
General Electric Co.
Long Co., E. G.
Westinghouse Elec. & M. Co.

**Compressors, Air.**
General Electric Co.
Westinghouse Trac. B. Co.

**Condensers.**
General Electric Co.
Westinghouse Elec. & M. Co.

**Conduits, Underground.**
Johns-Manville Co., H. W.

**Connectors, Solderless.**
Frankel Connector Co.
Horne Mfg. Co.

**Controller Regulators.**
Electric Service Supplies Co.

**Controllers or Parts.**
Columbia M. W. & M. I. Co.
Electric Service Supplies Co.
General Electric Co.
Horne Mfg. Co.
Johns-Manville Co., H. W.
Kerschner Co., Inc., W. R.
Westinghouse Elec. & M. Co.

**Controlling Systems.**
General Electric Co.
Westinghouse Elec. & M. Co.

**Converters, Rotary.**
General Electric Co.
Westinghouse Elec. & M. Co.

**Conveying and Hoisting Machinery.**
American Bridge Co.
Columbia M. W. & M. I. Co.
Green Engrg. Co.

**Cord, Bell, Trolley, Register, etc.**
Brill Co., The J. G.
Electric Service Supplies Co.
International Register Co., The
Long Co., E. G.
Roebling's Sons Co., John A.
Samson Cordage Works

**Cord Connectors and Couplers.**
Electric Service Supplies Co.
Samson Cordage Works
Wood Co., Chas. N.

**Couplers, Car.**
Brill Co., The J. G.
Long Co., E. G.
Ohio Brass Co.
Van Dorn Coupler Co.
Westinghouse Trac. B. Co.

**Couplings, Conduit.**
Horne Mfg. Co.

**Cranes.—(See also Hoists.)**
Niles-Bement-Pond Co.

**Creosoting. (See Wood Preservatives.)**

**Cross Arms. (See Brackets.)**

**Crossing Foundations.**
International Steel Tie Co.

**Crossing Signals. (See Signals, Crossing.)**

**Crossings, Track. (See Track, Special Work.)**

**National Railway Appliance Company**

50 East 42d St., NEW YORK CITY
Chicago Washington, D. C.

**RAILWAY SUPPLIES**

*SELLING AGENTS FOR*

Tool Steel Gears and Pinions
Johnson Fare Box
Perry Side Bearings
Hartman Centering Center Plates
Wasson Trolley Bases
Garland Ventilator
Electric Arc Welders
High Class Railway Varnishes and Enamels
Elastic Car Waste

Special Agents for
- Tool Steel Gear & Pinion Co.
- Johnson Fare Box Co.
- C. & C. Electric & Mfg. Co.
- Holden & White

General Agents for Anglo-American Varnish Co.
Eastern Agents for Union Fibre Co.

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To attain the highest possible standard of service is the dominating purpose which subordinates all other considerations in the designing and building of

**Weston Indicating Instruments**

Especially in this field of Electrical Measurement, such an ideal is thoroughly consistent with practical commercial demands. So it is that Weston pre-eminence is as well recognized from the commercial standpoint as from the scientific.

**Weston Electrical Instrument Co.**
21 Weston Ave., Newark, N. J.
23 Branch Offices in the Larger Cities.

Model 310 Portable Single-Phase and D.C. Wattmeter

Weston models include complete groups of Portable and Switchboard Instruments for service on A.C. and on D.C. circuits, together with many instruments designed for special purposes. Write for particulars regarding any need.

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owe some of their efficiency to the thought, energy and resourcefulness of manufacturers who supply the means for such achievements.

These men know how important it is for them to keep in touch with the manufacturers.

In the electric railway industry, such men find the easy, certain and thorough way to keep in touch with manufacturers is through the advertising pages of the

**Electric Railway Journal**
239 West 39th Street New York

**Standing the Overload**

What's the usual result of an overload on your car motors or compressors?

A puff of smoke—followed by a trip to the repair shop. You can eliminate these trips by using

**Salamander Fireproof Wire**

motor field, armature and compressor coils. You can't burn out Salamander Wire Coils. We've had them red-hot on test without any breakdown.

*Send for samples and catalogs.*

**Independent Lamp & Wire Co., Inc.**
Offices: 1737 Broadway, New York
FACTORIES: York, Pa., and Weehawken, N. J.

# WHAT AND WHERE TO BUY

**Culverts.**
American Rolling Mill Co.
Bark River B. & Culvert Co.
California Cor. Culvert Co.
Canada Ingot & Iron Co., Ltd.
Canton Culvert & Silo Co.
Coast Culvert & Flume Co.
Corrugated Culvert Co.
Delaware Metal Culvert Co.
Dixie Culvert & Metal Co.
Hardesty Mfg. Co., R.
Illinois Corrugated Metal Co.
Independence Culvert Co.
Iowa Pure Iron Culvert Co.
Kentucky Culvert Mfg. Co.
Lee-Arnett Co.
Lone Star Culvert Co.
Lyle Corrugated Culvert Co.
Michigan Bridge & Pipe Co.
Montana Culvert Co.
Nebraska Culvert & Mfg. Co.
Nevada Metal Mfg. Co.
New England Metal Cul. Co.
North East Metal Co.
Northwestern Sheet & I. Wks.
O'Neall Co., W. Q.
Ohio Corrugated Culvert Co.
Pennsylvania Metal Cul. Co.
Road Supply & Metal Co.
Sioux Falls Metal. Cul. Co.
Spokane Corr. Cul. Co.
Tennessee Metal Culvert Co.
Utah Corr. Cul. & Flume Co.
Virginia Metal & Culvert Co.
Western Metal Mfg. Co.
Wyatt Mfg. Co.

**Curtains and Curtain Fixtures.**
Brill Co., The J. G.
Electric Service Supplies Co.
Hartshorn Company, Stewart
Pantasote Co., The
St. Louis Car Co.

**Cutting Apparatus.**
Oxweld Acetylene Co.

**Derailing Devices. (See also Track Work.)**
Cleveland Frog & Crossing Co.

**Destination Signs.**
Columbia M. W. & M. I. Co.
Electric Service Supplies Co.

**Detective Service.**
Wisch Service, P. Edward

**Dispatching Systems.**
Simmen Automatic Ry. Sig. Co.

**Door Operating Devices.**
Consolidated Car Heating Co.
National Pneumatic Co.

**Doors, Asbestos.**
Johns-Manville Co., H. W.

**Doors and Door Fixtures.**
Brill Co., The J. G.
General Electric Co.
Hale & Kilburn Co.

**Doors, Folding Vestibule.**
National Pneumatic Co.

**Doors & Shutters, Fireproof.**
Kinnear Mfg. Co.

**Doors, Steel Rolling.**
Kinnear Mfg. Co.

**Draft Rigging. (See Couplers.)**

**Drills, Track.**
American Steel & Wire Co.
Electric Service Supplies Co.
Long Co., E. G.
Niles-Bement-Pond Co.
Ohio Brass Co.

**Dryers, Sand.**
Electric Service Supplies Co.
Zelnicker Sup. Co., W. A.

**Engineers, Consulting, Contracting and Operating.**
Archbold-Brady Co.
Arnold Co., The
Beeler, John A.
Burch, Edw. P.
Byllesby & Co., Inc., H. M.
Ford, Bacon & Davis
Hunt & Co., Robert W.
Jackson, D. C. & Wm. B.
Little, Inc., Arthur D.
Richey, Albert S.
Sanderson & Porter
Scofield Engineering Co.
Stephenson Sons Co., S.
Stone & Webster Eng. Corp.
White Companies, J. G.
Woodmansee & Davidson, Inc.

**Engines, Gas and Oil.**
Westinghouse Elec. & M. Co.

**Engines, Steam.**
Westinghouse Elec. & M. Co.

**Fare Boxes.**
Brill Co., The J. G.
Cleveland Fare Box Co.
International Register Co., The
Johnson Fare Box Co.

**Fences, Woven Wire and Fence Posts.**
American Steel & Wire Co.
Page Woven Wire Fence Co.

**Fenders and Wheel Guards.**
Brill Co., The J. G.
Cleveland Fare Box Co.
Consolidated Car Fender Co.
Electric Service Supplies Co.
Horne Mfg. Co.
Star Brass Works

**Fibre Insulation.**
National Ry. Appliance Co.

**Fibre and Fibre Tubing.**
Diamond State Fibre Co.
Johns-Manville Co., H. W.
Westinghouse Elec. & M. Co.

**Field Coils. (See Coils.)**

**Filters, Water.**
Scaife & Sons Co., Wm. B.

**Fire Extinguishing Apparatus.**
Johns-Manville Co., H. W.

**Fire-Proofing Material.**
Johns-Manville Co., H. W.

**Flooring Composition.**
American Mason Safety Tread Co.
Johns-Manville Co., H. W.

**Forgings.**
Eureka Co.
Standard Steel Works Co.

**Frogs, Track. (See Track Work.)**

**Furnaces. (See Stokers.)**

**Fuses and Fuse Boxes.**
Columbia M. W. & M. I. Co.
D & W Fuse Co.
Daum, A. F.
General Electric Co.
Johns-Manville Co., H. W.
Westinghouse Elec. & M. Co.

**Fuses, Refillable.**
Columbia M. W. & M. I. Co.
Economy Fuse & Mfg. Co.
General Electric Co.
Horne Mfg. Co.

**Gaskets.**
Diamond State Fibre Co.
Johns-Manville Co., H. W.
Power Specialty Co.

**Gas Producers.**
Westinghouse Elec. & M. Co.

**Gates, Car.**
Brill Co., The J. G.
Jewett Car Co.

**Gages, Oil and Water.**
Ohio Brass Co.

**Gear Blanks.**
Carnegie Steel Co.
Diamond State Fibre Co.
Standard Steel Works Co.

**Gear Cases.**
Columbia M. W. & M. I. Co.
Electric Service Supplies Co.
Kerschner Co., Inc., W. R.
National Ry. Appliance Co.
Thayer & Co., Inc.
Westinghouse Elec. & M. Co.

**Gears and Pinions.**
Columbia M. W. & M. I. Co.
Diamond State Fibre Co.
Electric Service Supplies Co.
General Electric Co.
Kerschner Co., Inc., W. R.
Long Co., E. G.
National Ry. Appliance Co.
Nuttall Co., R. D.
Tool Steel Gear & Pinion Co.

**Generating Sets, Gas-Electric.**
General Electric Co.

**Generators.**
General Electric Co.
Westinghouse Elec. & M. Co.

**Gongs. (See Bells and Gongs.)**

**Graphite.**
Dixon Crucible Co., Joseph
Morgan Crucible Co.

**Greases. (See Lubricants.)**

**Grinders and Grinding Supplies.**
General Electric Co.
Goldschmidt Thermit Co.
Railway Track-work Co.

**Guards, Cattle.**
American Bridge Co.

**Guards, Trolley.**
Electric Service Supplies Co.
Ohio Brass Co.

**Harps, Trolley.**
Anderson M. Co., A. & J. M.
Electric Service Supplies Co.
Hensley Trolley & Mfg. Co.
More-Jones B. & M. Co.
Nuttall Co., R. D.
Star Brass Works.

**Headlights.**
Electric Service Supplies Co.
General Electric Co.
Kerschner Co., Inc., W. R.
Long Co., E. G.
Ohio Brass Co.
St. Louis Car Co.
Westinghouse Elec. & M. Co.

**Headlining.**
Kerschner Co., Inc., W. R.
Pantasote Co., The.

**Heaters, Car (Electric).**
Consolidated Car Heating Co.
Gold Car Heating & Lighting Co.
Smith Heater Co., Peter.

**Heaters, Car, Hot Air and Water.**
Cooper Heater Co.
Smith Heater Co., Peter.

**Heaters, Car (Stove).**
Electric Service Supplies Co.
Smith Heater Co., Peter.

**Hoists and Lifts.**
Columbia M. W. & M. I. Co.
Duff Mfg. Co.
Ford Chain Block & Mfg. Co.
Niles-Bement-Pond Co.

**Hose, Bridges.**
Ohio Brass Co.

**Hose, Pneumatic and Fire.**
Johns-Manville Co., H. W.

**Hydraulic Machinery.**
Niles-Bement-Pond Co.

**Hydrogrounds.**
Horne Mfg. Co.

**Inspection.**
Electrical Testing Lab's.
Hunt & Co., Robt. W.

**Instruments, Measuring, Testing and Recording.**
General Electric Co.
Johns-Manville Co., H. W.
Sangamo Electric Co.
Westinghouse Elec. & M. Co.
Weston Elec'l Instrument Co.

**Insulating Cloth, Paper and Tape.**
Diamond State Fibre Co.
General Electric Co.
Johns-Manville Co., H. W.
Mechanical Rubber Co.
Packard Electric Co.
Standard Paint Co.
Standard Underground Cable Co.
Standard Woven Fabric Co.
Westinghouse Elec. & M. Co.

**Insulations. (See also Paints.)**
Anderson M. Co., A. & J. M.
Diamond State Fibre Co.
Electric Service Supplies Co.
General Electric Co.
Holden & White, Inc.
Johns-Manville Co., H. W.
Mechanical Rubber Co.
Westinghouse Elec. & M. Co.

**Insulators. (See also Line Material.)**
Anderson M. Co., A. & J. M.
Drew Elec. & Mfg. Co.
Electric Ry. Equip. Co.
Electric Service Supplies Co.
General Electric Co.
Johns-Manville Co., H. W.
Ohio Brass Co.
Westinghouse Elec. & M. Co.

**Insulator Pins.**
Hubbard & Co.

**Insurance, Fire.**
Marsh & McLennan

**Jacks. (See also Cranes, Hoists and Lifts.)**
Brill Co., The J. G.
Buckeye Jack Mfg. Co.
Columbia M. W. & M. I. Co.
Duff Manufacturing Co.
National Ry. Appliance Co.

**Joints, Rail.**
Atlantic Welding Co.
Carnegie Steel Co.
Rail Joint Co.
Zelnicker Sup. Co., W. A.

**Journal Boxes.**
Bemis Car Truck Co.
Brill Co., The J. G.
Hess-Bright Mfg. Co.
Long Co., E. G.
Railway Roller Bearing Co.

**Junction Boxes.**
Johns-Manville Co., H. W.
Standard Underground Cable Co.

**Laboratory.**
Electric Testing Lab's.
Little, Inc., Arthur D.

**Lamp Guards and Fixtures.**
Anderson M. Co., A. & J. M.
Electric Service Supplies Co.
General Electric Co.
Westinghouse Elec. & M. Co.

**Lamps, Arc and Incandescent. (See also Headlights.)**
Anderson M. Co., A. & J. M.
General Electric Co.
Westinghouse Elec. & M. Co.

**Lamps, Signal and Marker.**
Ohio Brass Co.

**Lathes, Car Wheel.**
Niles-Bement-Pond Co.

**Lighting Regulators, Car.**
Holden & White, Inc.

**Lightning Protection.**
Anderson M. Co., A. & J. M.
Electric Service Supplies Co.
General Electric Co.
Horne Mfg. Co.
Ohio Brass Co.
Westinghouse Elec. & M. Co.

**Line Material. (See also Brackets, Insulators, Wires, etc.)**
Anderson M. Co., A. & J. M.
Columbia M. W. & M. I. Co.
Diamond State Fibre Co.
Drew Elec. & Mfg. Co.
Electric Ry. Equip. Co.
Electric Service Supplies Co.
Eureka Co.
General Electric Co.
Holden & White, Inc.
Hubbard & Co.
Johns-Manville Co., H. W.
More-Jones B. & M. Co.
Ohio Brass Co.
Westinghouse Elec. & M. Co.

**Lock Nuts.**
Roller Lock Nut Co.

**Locomotives, Electric.**
Baldwin Locomotive Works.
Brill Co., The J. G.
General Electric Co.
Westinghouse Elec. & M. Co.

**Lubricants, Oil and Grease.**
Dearborn Chemical Co.
Dixon Crucible Co., Jos.

**Lumber. (See Poles, Ties, etc.)**

**Machine Tools.**
Columbia M. W. & M. I. Co.
Niles-Bement-Pond Co.

**Machine Work.**
Columbia M. W. & M. I. Co.
Horne Mfg. Co.

**Mats.**
Johns-Manville Co., H. W.

**Meters. (See Instruments.)**

**Meters, Car, Watt-Hour.**
Sangamo Electric Co.

**Mica.**
Long Co., E. G.

**Mirrors for Motormen.**
Drew Elec. & Mfg. Co.

**Motormen's Seats.**
Electric Service Supplies Co.
Wood Co., Chas. N.

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"Fill the place of the men you cannot get"

And more than that this pneumatic equipment should more than save you its cost in a single season's work. The story of how and why is in

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ELECTRIC MOTOR and TRAILER TRUCKS

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are made for every condition and requirement. M. C. B. Pin and Link, Car and Air, in all sizes and types.

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Samson Bell and Register Cord

Solid braided cotton, extra quality. All sizes and colors. More durable, more economical and better looking than leather or rawhide. Send for samples and full information.

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# WHAT AND WHERE TO BUY

**Motors, Electric.**
General Electric Co.
Westinghouse Elec. & M. Co.

**Motor Generation, Bonding and Welding.**
Lincoln Bonding Co.

**Motor Trucks.**
General Vehicle Co., Inc.

**Nuts and Bolts.**
Bemis Car Truck Co.
Columbia M. W. & M. I. Co.
Hubbard & Co.
Long Co., E. G.
National Railway Appliance Co.
Roller Lock Nut Co.

**Oils. (See Lubricants.)**

**Oxy-Acetylene. (See Cutting Apparatus, Oxy-Acetylene.)**

**Packing.**
Diamond State Fibre Co.
Electric Service Supplies Co.
Horne Mfg. Co.
Johns-Manville Co., H. W.
Mechanical Rubber Co.
Post & Co., Inc., E. L.
Power Specialty Co.

**Packing Rings.**
Johns-Manville Co., H. W.

**Paints and Varnishes. (Insulating.)**
General Electric Co.
Johns-Manville Co., H. W.
Long Co., E. G.
Packard Electric Co.
Standard Paint Co.

**Paints and Varnishes. (Preservative.)**
Dixon Crucible Co., Jos.
Johns-Manville Co., H. W.
Long Co., E. G.
National Ry. Appliance Co.
Standard Paint Co.

**Paints and Varnishes for Woodwork.**
National Ry. Appliance Co.

**Paving Bricks, Filler and Stretcher.**
Nelsonville Brick Co.

**Paving Material.**
Am. Brake Shoe & Fdy. Co.
Nelsonville Brick Co.

**Pickups, Trolley Wire.**
Electric Service Supplies Co.
Ohio Brass Co.

**Pinion Pullers.**
Columbia M. W. & M. I. Co.
Electric Service Supplies Co.
General Electric Co.
Wood Co., Chas. N.

**Pinions. (See Gears.)**

**Pins, Case Hardened, Wood and Iron.**
Bemis Car Truck Co.
Electric Service Supplies Co.
Long Co., E. G.
Ohio Brass Co.

**Pipe.**
National Tube Co.

**Pipe Fittings.**
National Tube Co.
Power Specialty Co.
Standard Steel Works Co.

**Planers. (See Machine Tools.)**

**Pole Reinforcing.**
Hubbard & Co.

**Poles and Ties, Treated.**
Lindsley Bros. Co.
Page & Hill Co.
Valentine-Clark Co.

**Poles, Metal Street.**
Bates Expanded Steel Truss Co.
Electric Ry. Equip. Co.
Hubbard & Co.
National Tube Co.

**Pole Sleeves.**
Drew Elec. & Mfg. Co.

**Poles, Ties, Posts, Piling and Lumber.**
Carney & Co., B. J.
Lindsley Bros. Co.
Page & Hill Co.

Valentine-Clark Co.

**Poles, Trolley.**
Anderson M. Co., A. & J. M.
Columbia M. W. & M. I. Co.
Electric Service Supplies Co.
Long Co., E. G.
National Tube Co.
Nuttall Co., R. D.

**Power Saving Devices.**
Arthur Power-Saving Recorder Co.
Railway Improvement Co.

**Pressure Regulators.**
General Electric Co.
Ohio Brass Co.

**Punches, Ticket.**
Bonney-Vehslage Tool Co.
International Register Co., The.
Wood Co., Chas. N.

**Purifiers, Feed Water.**
Scaife & Sons Co., Wm. B.

**Rail Grinders. (See Grinders.)**

**Rail Welding. (See Brazing and Welding Processes.)**

**Rails, Relaying.**
Zelnicker Supply Co., W. A.

**Rattan.**
Brill Co., The J. G.
Electric Service Supplies Co.
Hale & Kilburn Co.
Jewett Car Co.
St. Louis Car Co.

**Recorders, Power Saving.**
Arthur Power-Saving Recorder Co.

**Registers and Fittings.**
Bonham Recorder Co.
Brill Co., The J. G.
Electric Service Supplies Co.
International Register Co., The.
Long Co., E. G.
Rooke Automatic Register Co.

**Reinforcement, Concrete.**
American Steel & Wire Co.

**Repair Shop Appliances. (See also Coil Banding and Winding Machines.)**
Columbia M. W. & M. I. Co.
Electric Service Supplies Co.

**Repair Work. (See also Coils.)**
Cleveland Armature Works.
Columbia M. W. & M. I. Co.
General Electric Co.
Independent Lamp & Wire Co.
Westinghouse Elec. & M. Co.

**Replacers, Car.**
Columbia M. W. & M. I. Co.
Electric Service Supplies Co.

**Resistance, Grid.**
Columbia M. W. & M. I. Co.
Ellcon Co.

**Resistance, Wire and Tube.**
General Electric Co.
Westinghouse Elec. & M. Co.

**Retrievers, Trolley. (See Catchers and Retrievers, Trolley.)**

**Rheostats.**
Ellcon Co.
General Electric Co.
Westinghouse Elec. & M. Co.

**Roofing, Building.**
Johns-Manville Co., H. W.
Standard Paint Co.

**Roofing, Car.**
Johns-Manville Co., H. W.
Pantasote Co., The.

**Rubber Specialties of all Kinds.**
Mechanical Rubber Co.

**Sand Blasts.**
National Ry. Appliance Co.

**Sanders, Track.**
Brill Co., The J. G.
Cleveland Fare Box Co.
Columbia M. W. & M. I. Co.
Electric Service Supplies Co.
Horne Mfg. Co.
Holden & White, Inc.
Jewett Car Co.
Ohio Brass Co.
St. Louis Car Co.

**Sash Fixtures, Car.**
Brill Co., The J. G.

**Sash Metal, Car Window.**
Hale & Kilburn Co.

**Scales, Weights, Balances and Dynamometers.**
Horne Mfg. Co.

**Scrapers, Track. (See Cleaners and Scrapers, Track.)**

**Seating Material. (See also Rattan.)**
Pantasote Co., The.

**Seats, Car.**
Brill Co., The J. G.
Hale & Kilburn Co.
Jewett Car Co.
St. Louis Car Co.

**Second-Hand Equipment. (See also pages 54, 55.)**
Archer & Baldwin.
Kerschner Co., Inc., W. R.
MacGovern & Co., Inc.

**Shade Rollers.**
Hartshorn Co., Stewart.

**Shades, Vestibule.**
Brill Co., The J. G.
Electric Service Supplies Co.

**Shovels.**
Hubbard & Co.

**Signal Systems, Block.**
Electric Service Supplies Co.
Federal Signal Co.
Simmen Automatic Railway Signal Co.
Wood Co., Chas. N.

**Signals, Car Starting.**
Consolidated Car Heating Co.
National Pneumatic Co.

**Signals, Highway Crossing.**
Electric Service Supplies Co.

**Slack Adjusters. (See Brake Adjusters.)**

**Sleet Wheels and Cutters.**
Anderson Mfg. Co., A. & J. M.
Bonney-Vehslage Tool Co.
Columbia M. W. & M. I. Co.
Drew Elec. & Mfg. Co.
Holden & White, Inc.
More-Jones B. & M. Co.
Nuttall Co., R. D.

**Snow-Plows, Sweepers and Brooms.**
Brill Co., The J. G.
Columbia M. W. & M. I. Co.
Consolidated Car Fender Co.

**Soldering and Brazing Apparatus. (See Welding, Processes and Apparatus.)**

**Speed Indicators.**
Johns-Manville Co., H. W.

**Spikes.**
American Steel & Wire Co.

**Splicing Compounds.**
Johns-Manville Co., H. W.
Mechanical Rubber Co.
Standard Woven Fabric Co.
Westinghouse Elec. & M. Co.

**Splicing Sleeves. (See Clamps and Connectors.)**

**Springs, Car & Truck.**
American Steel Foundries
American Steel & Wire Co.
Bemis Car Truck Co.
Brill Co., The J. G.
Long Co., E. G.
Standard Steel Works Co.
Union Spring & Mfg. Co.

**Sprinklers, Track & Road.**
Brill Co., The J. G.
St. Louis Car Co.

**Steps, Car.**
American Mason S. T. Co.
Universal Safety Tread Co.

**Stokers, Mechanical.**
Babcock & Wilcox Co.
Green Engrg. Co.
Murphy Iron Works.
Westinghouse Elec. & M. Co.

**Storage Batteries. (See Batteries, Storage.)**

**Straps, Car, Sanitary.**
Holden & White, Inc.
Railway Improvement Co.

**Structural Iron. (See Bridges.)**

**Sub Stations.**
Delta Star Electric Co.

**Superheaters.**
Babcock & Wilcox Co.
Power Specialty Co.

**Sweepers, Snow. (See Snow Plows, Sweepers & Brooms.)**

**Switch Stands.**
Kilby Frog & Switch Co.
Ramapo Iron Works.

**Switches. Track. (See Track, Special Work.)**

**Switches & Switchboards.**
Anderson Mfg. Co., A. & J. M.
Cutter Electrical & Mfg. Co.
Delta Star Electric Co.
Electric Service Supplies Co.
General Electric Co.
Westinghouse Elec. & M. Co.

**Tampers, Tie.**
Ingersoll-Rand Co.

**Tapes and Cloths. (See Insulating Cloths, Paper and Tape.)**

**Telephones and Parts.**
Electric Service Supplies Co.

**Terminals, Cable.**
Standard Underground Cable Co.

**Testing Clips.**
Frankel Connector Co.

**Testing, Commercial & Electrical.**
Elec'l Testing Laboratories.
Hunt & Co., Robert W.

**Testing Instruments. (See Instruments, Electrical Measuring, Testing, etc.)**

**Thermostats.**
Consolidated Car Heating Co.
Gold Car Heating & Lighting Co.
Railway Utility Co.
Smith Heater Co., Peter.

**Ticket Choppers & Destroyers.**
Electric Service Supplies Co.
Patten Co., Paul B.

**Ties and Tie Rods, Steel.**
American Bridge Co.
Carnegie Steel Co.
International Steel Tie Co.

**Ties, Wood Cross. (See Poles, Ties, Posts, etc.)**

**Tools, Track & Miscellaneous.**
American Steel & Wire Co.
Columbia M. W. & M. I. Co.
Electric Service Supplies Co.
Hubbard & Co.
Johns-Manville Co., H. W.
Klein & Sons, Mathias.
Railway Track-work Co.

**Torches, Acetylene. (See Cutting Apparatus.)**

**Towers & Transmission Structures.**
American Bridge Co.
Archbold-Brady Co.
Bates Exp. Steel Truss Co.
Delta Star Electric Co.
Westinghouse Elec. & M. Co.

**Tower Wagons and Automobiles.**
General Vehicle Co., Inc.
McCardell & Co., J. R.

**Track, Special Work.**
Cleveland Frog & Cross. Co.
Columbia M. W. & M. I. Co.
Kilby Frog & Switch Co.
New York Switch & Crossing Co.
Ramapo Iron Works.

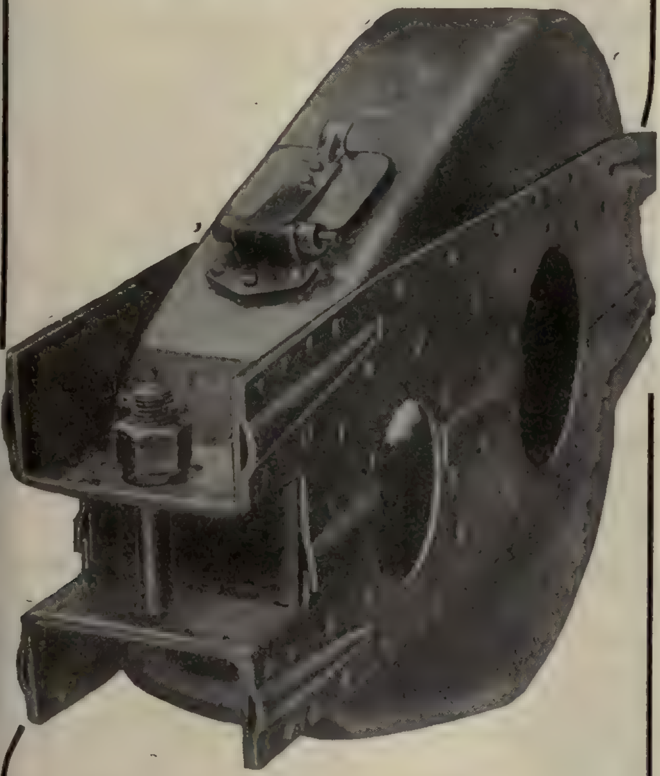
**Transfers. (See Tickets.)**

**Transfer Tables.**
American Bridge Co.
Archbold-Brady Co.

**Transformers.**
General Electric Co.
Packard Electric Co.
Westinghouse Elec. & M. Co.

**Treads, Safety, Stairs, Car Step.**
American Mason S. T. Co.
Universal Safety Tread Co.

# Chillingworth Gear Cases



**Seamless**

This feature protects your gears and pinions from water, mud, etc., and prevents oil leakage.

**Rivet-less**

This feature defies vibration, which is a great menace to rivets.

**Lightweight**

40% less than malleable iron cases and equally durable, if not more so, especially on bad roadbeds, where a bump will smash the former and only dent the Chillingworth.

**Thayer & Co., Inc.**

**Selling Agents in U. S. and Canada**

**111 Broadway New York**

---

# Arjuna Sahadeva

When an India baby is awakened by a thunder clap the mother must always exclaim "ARJUNA SAHADEVA" as an invocation to the heroes who are supposed to cause the thunder.

She exclaims "It's all right," and what does it net her? Answer, NOTHING!

And when a rotary starts acting up, making noise and light like an electric storm, the operator exclaims *"x!2xox those machines,"* and that gets him nowhere either, because he shouldn't damn the machines—the fault is in the brushes.

If he will properly consign his noisy brushes to the place Sherman reserved for war and have a Morgan engineer prescribe the proper type of Morganite there will be less blasphemy in the land—and more good operators.

Morganites are brushes to swear *by*—not *at*.

**The Morgan Crucible Company**

**Main Office and Factory**
**519 West 38th St., New York City**

DISTRICT AGENTS:
Lewis & Roth, 1012 Liberty Bldg., Philadelphia
Electrical Engineering & Mfg. Co.,
First National Bank Bldg., Pittsburgh
W. L. Rose Equipment Co.
La Salle Bldg., St. Louis, Mo.
Herzog Electric & Engineering Co.,
150 Steuart Street, San Francisco, Cal.
W. R. Hendrey Co., Hoge Bldg., Seattle, Wash.
Charles Farnham, I. W. Hellman Bldg., Los Angeles, Cal.

## WHAT AND WHERE TO BUY

**Trolley Bases.**
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Electric Service Supplies Co.
General Electric Co.
Holden & White, Inc.
Horne Mfg. Co.
More-Jones B. & M. Co.
Nuttall Co., R. D.
Ohio Brass Co.

**Trolley Bases, Retrieving.**
Holden & White, Inc.

**Trolleys & Trolley Systems.**
Ford Chain Block & Mfg. Co.

**Trolley Shoes.**
Holden & White, Inc.

**Trolley Wheels. (See Wheels, Trolley.)**

**Trucks, Car.**
American Steel Foundries
Baldwin Locomotive Works.
Bemis Car Truck Co.
Brill Co., The J. G.
Long Co., E. G.
St. Louis Car Co.

**Tubing, Steel.**
National Tube Co.

**Turbines, Steam.**
General Electric Co.
Westinghouse Elec. & M. Co.

**Turnstiles.**
Perey Mfg. Co., Inc.

**Union Couplings.**
National Tube Co.

**Valves.**
National Tube Co.
Ohio Brass Co.

**Varnishes. (See Paints, etc.)**

**Ventilators, Car.**
Brill Co., The J. G.
Globe Ventilator Co.
Holden & White, Inc.
Railway Utility Co.
St. Louis Car Co.

**Voltmeters. (See Instruments.)**

**Washers.**
Bound Brook Oil-less Bearing Co.
Diamond State Fibre Co.

**Water Softening and Purifying Systems.**
Scaife & Sons Co., Wm. B.

**Welders, Portable Electric.**
Electric Railway Improvement Co.

**Welding Processes and Apparatus.**
Atlantic Welding Co.
Electric Railway Improvement Co.
General Electric Co.
Goldschmidt Thermit Co.
National Ry. Appliance Co.
Oxweld Acetylene Co.
Westinghouse Elec. & M. Co.

**Wheel Guards. (See Fenders & Wheel Guards.)**

**Wheel Presses. (See Machine Tools.)**

**Wheels, Car, Cast Iron.**
Bemis Car Truck Co.
Griffin Wheel Co.
Long Co., E. G.

**Wheels, Car, Steel and Steel Tired.**
American Steel Foundries
Bemis Car Truck Co.
Carnegie Steel Co.
Standard Steel Works Co.

**Wheels, Trolley.**
Anderson Mfg. Co., A. & J. M.
Bound Brook Oil-less Bearing Co.
Columbia M. W. & M. I. Co.
Electric Service Supplies Co.
Eureka Co.
General Electric Co.
Hensley Trolley & Mfg. Co.
Holden & White, Inc.
Johns-Manville Co., H. W.
Long Co., E. G.
More-Jones B. & M. Co.
Nuttall Co., R. D.
Star Brass Works.

**Whistles, Air.**
General Electric Co.
Ohio Brass Co.

**Wire Rope.**
American Steel & Wire Co.
Roebling's Sons Co., John A.

**Wires and Cables.**
Aluminum Co. of America.
American Steel & Wire Co.
Bridgeport Brass Co.
D & W Fuse Co.
General Electric Co.
Packard Electric Co.
Page Woven Wire Fence Co.
Roebling's Sons Co., John A.
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**Wood Preservatives.**
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# Car Advertising Values

***Depend Largely Upon Constant and Expert Variation of Copy and Art Work***

Such constant and expert variation is possible only through a body like the Collier Organization whose salesmen are in constant touch with practically all live street car advertising possibilities

***From Coast to Coast***
***From Border to Border***

Thus Collier Service places at the disposal of the car advertiser not merely the knowledge and ideas of one man—no matter how expert—but the combined knowledge and ideas of scores and scores of Collier advertising specialists.

It is worth while to give your co-operation to the maintenance of these efforts, which also work largely to the benefit of the railway companies.

Barron G. Collier
INCORPORATED

**Candler Building**
**220 West 42nd Street, New York City**

**Railway Roller Bearings**

*Installing*

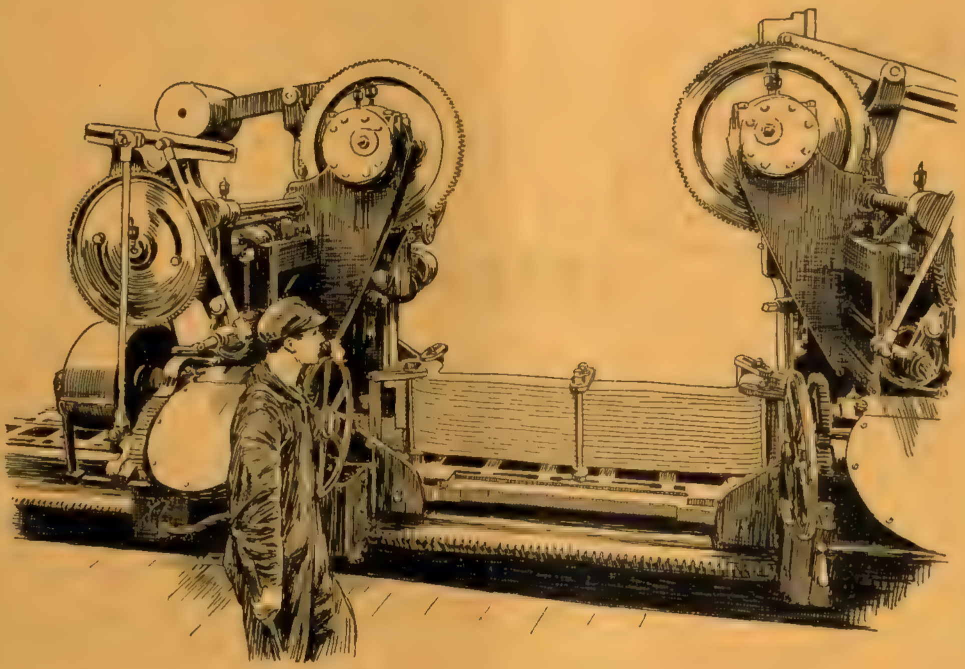
*Using*

*Inspecting*

*Checking Up Savings*

Railway Roller Bearings on this car of mine sure has put my coasting record way up," said the motorman of the Rollway equipped car. "And no more trouble for mine trying to keep up to schedule time. Any time I'm held up behind traffic and lose time I can make it up easy now by letting her out on a clear stretch. Those Railway Roller Bearings certainly make her roll some."

**The Railway Roller Bearing Co.**
Syracuse, New York



# Machinery for Accurate Alignment

The Brill Truck Preparation Department is equipped with every machine and facility to secure the best results in truck construction. The department adjoins the Truck Assembling Department, is under the same roof and is served by the same cranes. The double-head slotter in the picture is finishing a stack of equalizing bars for Brill interurban trucks which means that the bars will be identical in form, will fit snugly in the journal box pockets and hold the boxes the same distance apart on both sides of the trucks.

THE J. G. BRILL COMPANY, PHILADELPHIA, PA.
AMERICAN CAR COMPANY, ST. LOUIS, MO.
G. C. KUHLMAN CAR CO., CLEVELAND, OHIO.
JOHN STEPHENSON CO., ELIZABETH, N. J.
WASON MANFG. CO., SPRINGFIELD, MASS.
CIE J. G. BRILL, 49 Rue des Mathurins, PARIS.

# Your Oldest Motors Were Made for Fewer Stops

Ten, fifteen, twenty years ago the stops per mile on your city lines certainly were fewer than today.

Since then, many a farm has changed to a suburb and many a suburb has become an integral part of the city.

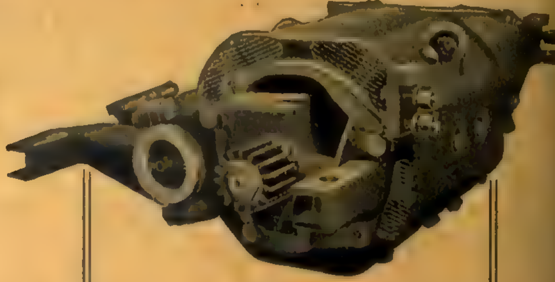
Yet you may still be using many of the motors that were designed for the old and easier conditions.

Some of these motors with more or less doctoring have held up well from the shop standpoint—

But they have not held up well from the far more important standpoint of reliable transportation—

Because only modern General Electric motors will meet the exacting requirements of the more severe service of today.

6788



## The G-E 247 Ventilated Railway Motor

is a 600-volt, box frame motor built especially for low floor 24-in. wheel cars. One hour rating—35 h.p. 600 volts. Full multiple ventilation. Operating in New York, Pittsburgh, Youngstown, Kansas City and many other places.

**General Electric Company**

General Office: Schenectady, N. Y.

Sales offices in all large cities

Dispatching the Work of the Engineering Department

# ELECTRIC RAILWAY JOURNAL

New York, July 28, 1917 McGraw-Hill Publishing Co., Inc. Vol. 50, No. 4 10c a copy

Cut Out Your Bad Track and Secure a Truly Continuous Rail

This job at Fort Worth, 330 Thermit Welds, is one of several installations made on the properties of Stone & Webster who have applied

THERMIT INSERT WELDS

*For Both New and Rehabilitated Rail*

Railways which build for TOMORROW instead of for TODAY will make Thermit Insert Welds standard for every form of city track construction.

Goldschmidt Thermit Co.

120 Broadway,
New York

# The Father of Them All

# Westinghouse No. 101-B Motor and Chips From the Old Block

306-CV

65 H.P. 600 VOLTS
33" WHEELS

532-A

50 H.P. 600 VOLTS
26" WHEELS

532-B

50 H P 600 VOLTS
30" WHEELS

All are bound together like sisters and brothers as if by inherited characteristics from their predecessors, together with all the refinements developed by the modern art of electric railroading.

514-A

40 H.P. 600 VOLTS
24" WHEELS

514-C

40 H.P. 600 VOLTS
30" WHEELS

506-A

25 H.P. 600 VOLTS
24" WHEELS

506-C

25 H.P. 600 VOLTS
30" WHEELS

750

W
WESTINGHOUSE ELECTRIC

## Westinghouse Electric & Manufacturing Company

East Pittsburgh, Pa.

Atlanta, Ga.
Baltimore, Md.
Birmingham, Ala.
Bluefield, W. Va.
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Buffalo, N. Y.
Butte, Mont.
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Charlotte, N. C.
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Cleveland, Ohio
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*W. E. & M. Co. of Texas.

# ELECTRIC RAILWAY JOURNAL

H. W. BLAKE, Editor

VOLUME 50, No. 4 NEW YORK, JULY 28, 1917 PAGES 131 TO 172

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Cable address: "Stryjourn," New York.

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Advertising Indexes—Alphabetical, 50; Classified, 44, 46, 48; Searchlight Section, 41, 43

The
Westinghouse Bungalow Compressor

is built up on a basic one-piece body casting of great strength which contains air cylinders, crank case, motor housing and all journal bearings.

Permanent and positive alignment of all bearings.

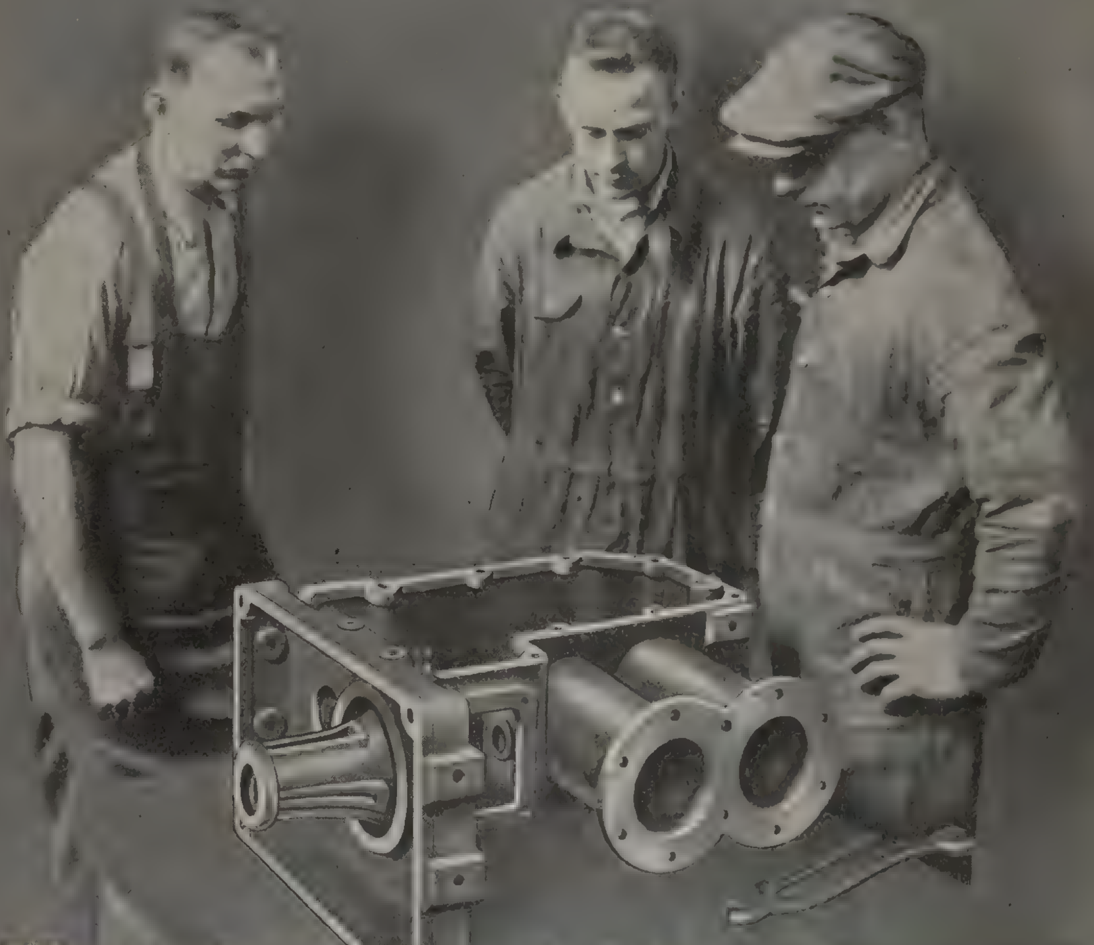
Absolute disappearance of reassembling troubles.

Combines greater simplicity and higher efficiency.

Decreases inspection and maintenance costs.

Capacities of 5, 10, 16, 38 and 50 cubic feet per minute.

For all classes of electric railway service. Send for D.C. Unit T-2016.



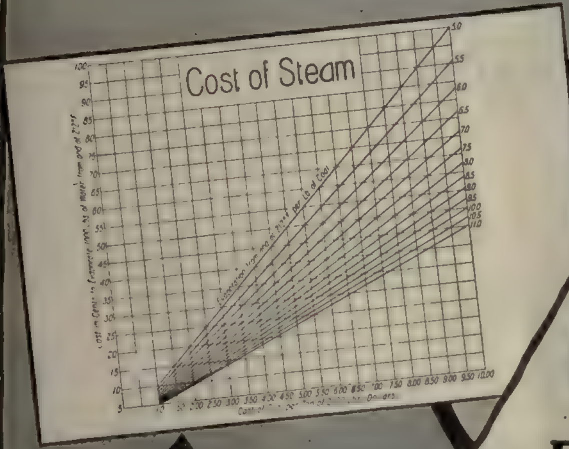
Westinghouse Traction Brake Company

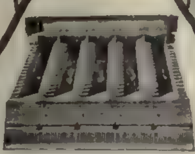
General Offices and Works: Wilmerding, Pa.

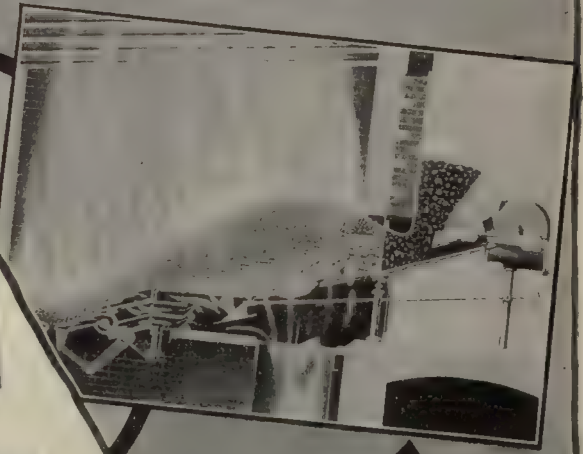
Atlanta, Ga.
Boston, Mass.
Chicago, Ill.
Columbus, O.
Denver, Col.
Houston, Tex.
Los Angeles,
Mexico City
New York, N. Y.
Pittsburgh, Pa.
Seattle, Wash.
San Francisco,
St. Louis, Mo.
St. Paul, Minn.

# Westinghouse

## Underfeed Stokers







Knowing the price and the amount of coal burned, and the quantity of water evaporated, the above table will tell you what it should cost you in cents per lb., to generate steam. This is a very useful table. We will gladly mail you a copy upon receipt of your name and business address.

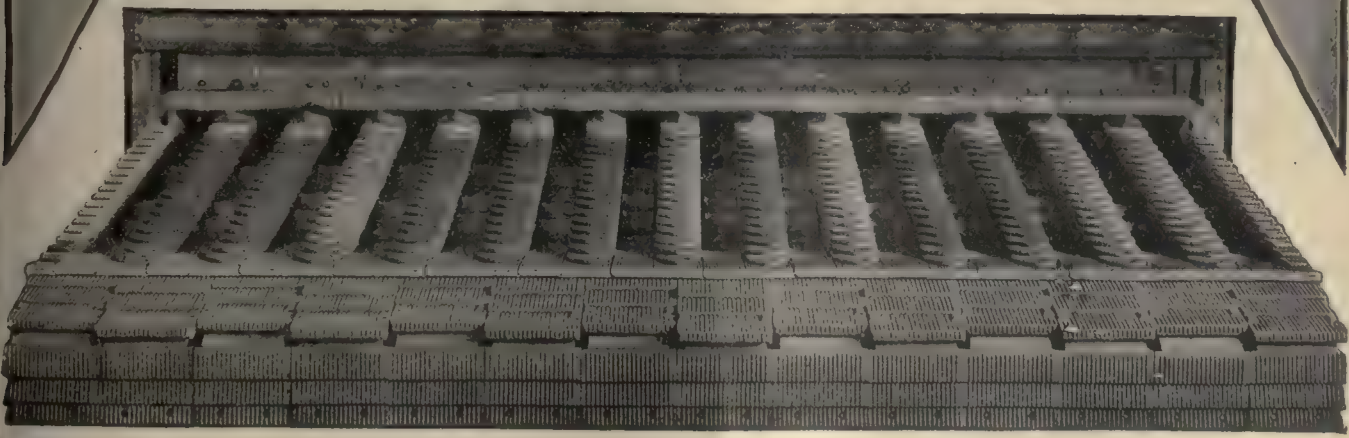
No waste—No idle equipment—No Banked Fires— No Boilers to be held in readiness for the daily peaks. FOR, the Westinghouse Underfeed Stoker embodies in its design a wonderful flexibility— a tremendous overload capacity.

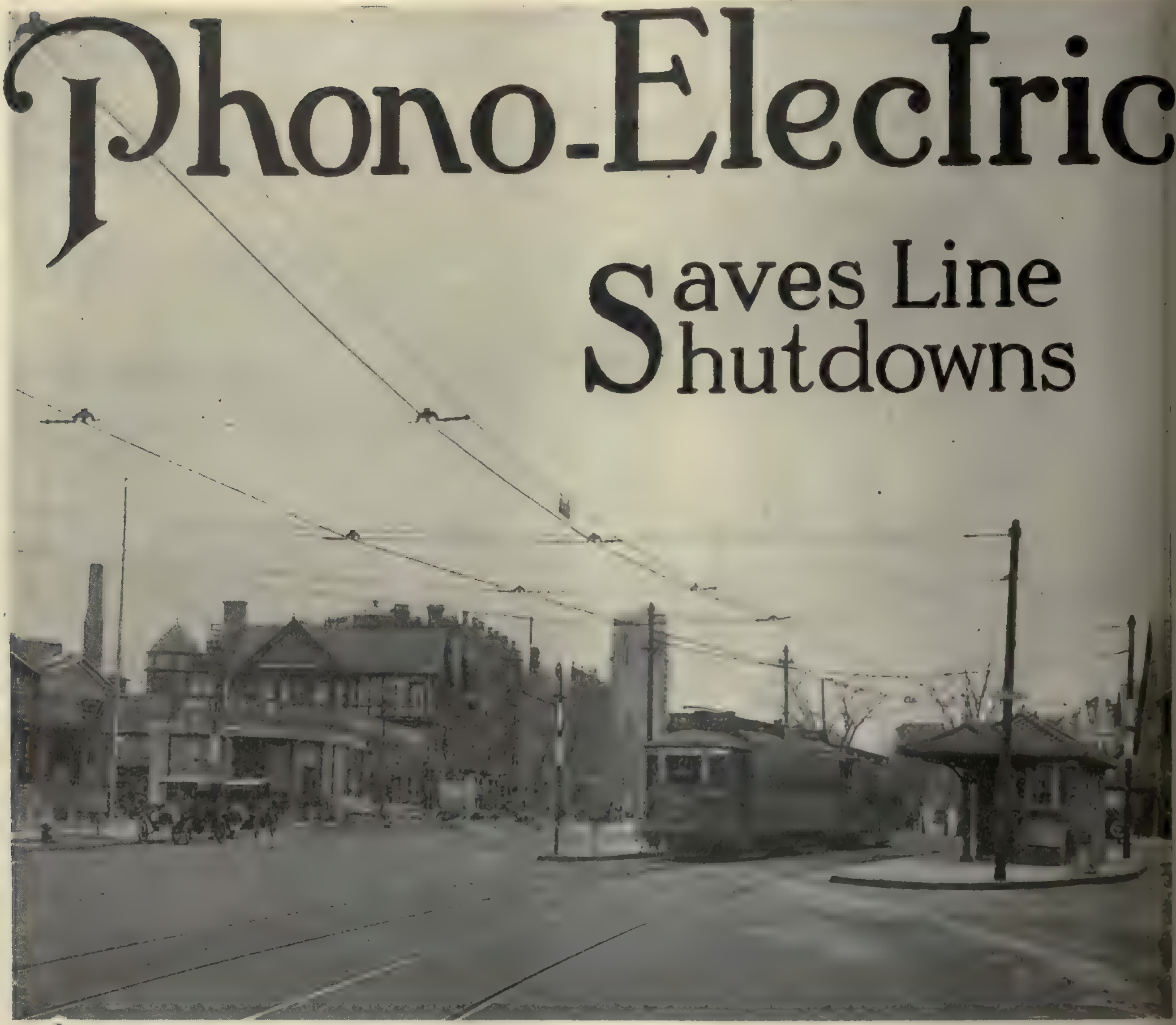
## Economy and Reserve Capacity for All

Even if you have but one or two small boilers, there is no reason why your economies and your reserve capacity should not be relatively equal to those of the big central station.

Westinghouse Underfeed Stokers are built in many sizes and for all steaming requirements.

**Westinghouse Electric and Manufacturing Company**
East Pittsburgh, Pa.





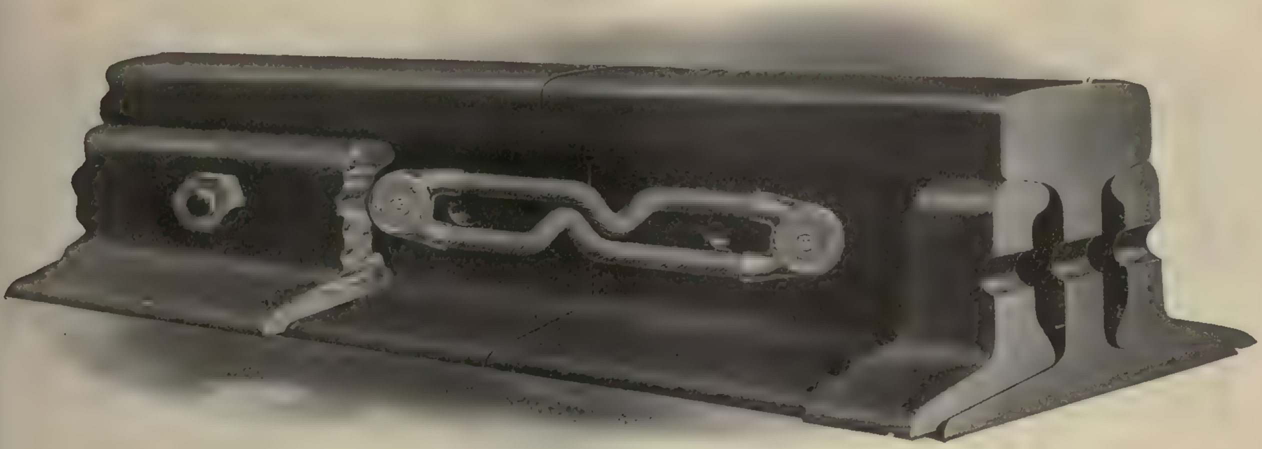
It may cost anywhere from $50 to $80 a mile for labor alone to take down and replace a No. 00 wire.

That's only one trouble factor from the lack of Phono-Electric trolley wire. Another is the disturbance to traffic due to shutting down a line for hours and inconveniencing the public.

The Phono-Electric Trolley Wire over the right-hand track at Coolidge Corner, Boston, is "all there" after six years, and we have every reason to believe it will be "all there" for years to come.

Phono-Electric is put up to stay up.

**Bridgeport Brass Company**
**Bridgeport Connecticut**



O-B Type F-3 Bond Installed (Patented)

# *The Terminal Makes the Bond*

The one principal difference between various bonds is the terminal. No bond can be better than its terminal.

Therefore, great pains are taken to assure the quality of that part of

## O-B
## Compressed Terminal and Pin Driven Bonds

The terminals of pure copper are properly forged and accurately machined—inspectors check the dimensions on every bond.

When the pressure is applied they expand smoothly, evenly, tightly to make a lasting, low-resistance contact.

This quality in the terminal typifies the quality of the whole bond.

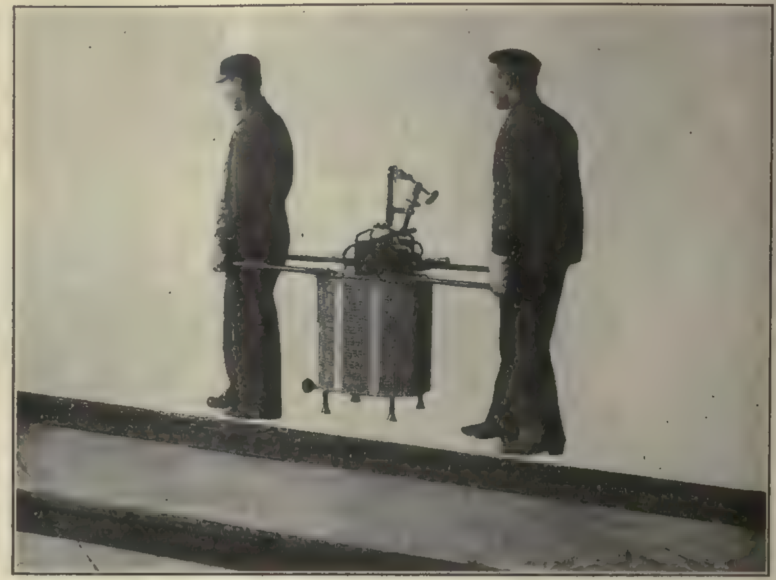
In addition to the broad range of O-B Stud Terminal Bonds there are many other types described in catalog No. 16, pages 466-527.

O-B Engineers will gladly assist you in finding the best method of bonding for your road.

**The Ohio Brass Co.**
**Mansfield, Ohio**

ERICO

THE LINE OF LEAST RESISTANCE



# Erico Portable Welder

## *for Erico Welded Bonds*

Here is an Electric Weld bonding outfit which is extremely light in weight and low in cost. It is designed for use on large and small roads alike, and can be mounted to meet local conditions. The complete outfit as shown in the cut can be easily carried by two men.

The Portable Welder is not intended to take the place of the ERICO Bonding Car or Champion Bonding Outfit. It is designed as a supplement to these efficient equipments and at the same time to fill the demand for a low priced welder.

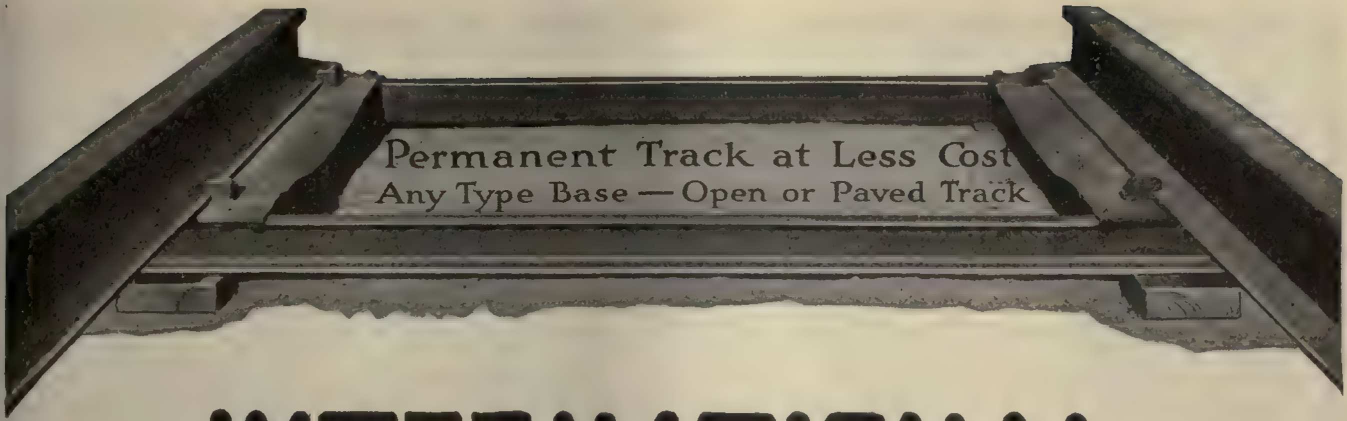
The Portable Welder installs our standard Electric Weld rail bonds and gives the same permanent weld as is obtained by using our ERICO Bonding Car. The heat is produced by means of an electric furnace. No flame or arc strikes the bond or rail.

The price of this outfit puts it within reach of every electric railway in the world.

***Write for Particulars***

**The Electric Railway Improvement Co.**

**Cleveland, Ohio**


Permanent Track at Less Cost
Any Type Base — Open or Paved Track

# INTERNATIONAL

## STEEL TWIN TIES

## *Every Square Inch in Effective Bearing*

International Steel Twin Ties are engineering structures, analyzed, designed and constructed on engineering principles.

Every piece of metal in the structure takes its share of the load—safely. There's no waste. The load stress cannot be concentrated at any one point; it is distributed over the entire structure, which presents a bearing area five times in excess of the area required for safety under 50-ton traffic.

Steel channels and steel plates riveted together make up the structure. Cast malleable clips and wedges clamp the rail in place. And there it stays, rail and tie remaining a unit in spite of all the vibration and pounding of hard service.

It's a permanent substructure permitting rail renewals at cost.

Let us submit comparative estimates on your job.

***Prompt Deliveries Made from Stock***

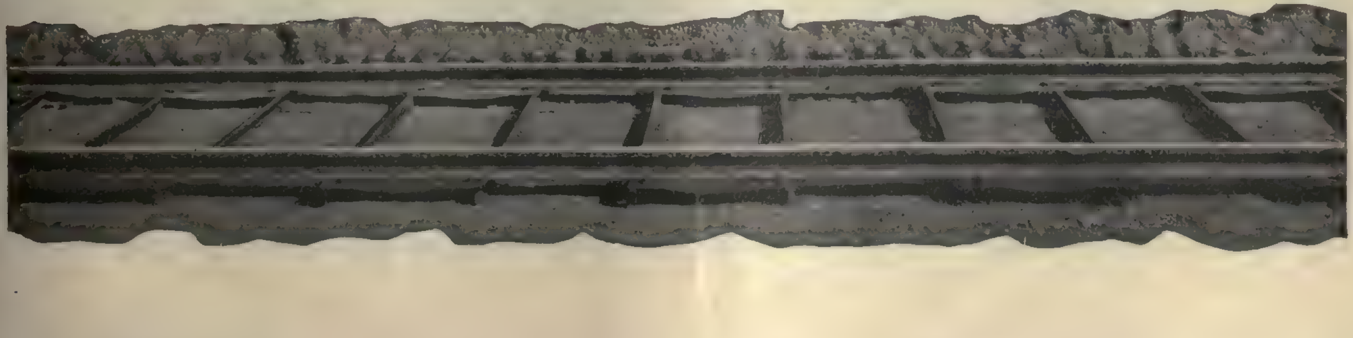
# The International Steel Tie Company

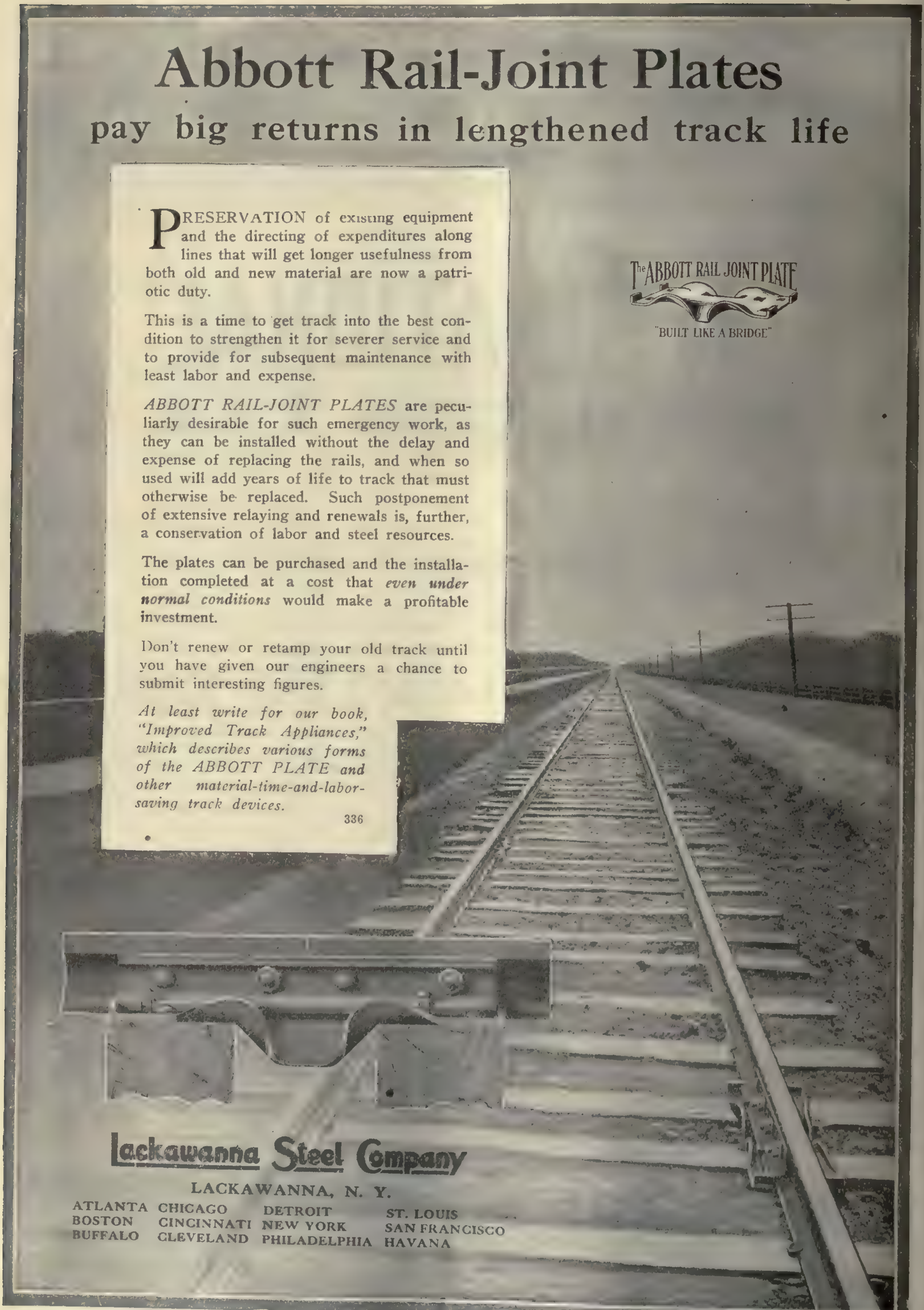
**Manufacturers of Steel Twin Ties and Crossing Foundations**

**General Sales Office and Works: Cleveland, Ohio**

REPRESENTATIVES:

Western Eng'g Sales Co., Los Angeles, Cal.
San Francisco, Cal. Seattle, Wash.
R. J. Cooper Co., Salt Lake City, Utah.
J. E. Lewis & Co., Dallas, Texas.
Maurice Joy, Philadelphia.
William H. Ziegler, Minneapolis, Minn.





Abbott Rail-Joint Plates

pay big returns in lengthened track life

PRESERVATION of existing equipment and the directing of expenditures along lines that will get longer usefulness from both old and new material are now a patriotic duty.

This is a time to get track into the best condition to strengthen it for severer service and to provide for subsequent maintenance with least labor and expense.

*ABBOTT RAIL-JOINT PLATES* are peculiarly desirable for such emergency work, as they can be installed without the delay and expense of replacing the rails, and when so used will add years of life to track that must otherwise be replaced. Such postponement of extensive relaying and renewals is, further, a conservation of labor and steel resources.

The plates can be purchased and the installation completed at a cost that *even under normal conditions* would make a profitable investment.

Don't renew or retamp your old track until you have given our engineers a chance to submit interesting figures.

*At least write for our book, "Improved Track Appliances," which describes various forms of the ABBOTT PLATE and other material-time-and-labor-saving track devices.*

336

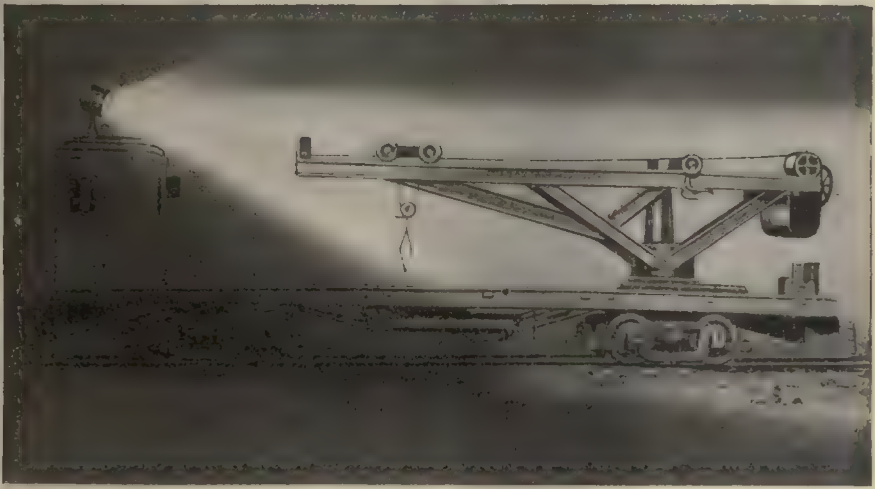
**Lackawanna Steel Company**

LACKAWANNA, N. Y.

ATLANTA CHICAGO DETROIT ST. LOUIS
BOSTON CINCINNATI NEW YORK SAN FRANCISCO
BUFFALO CLEVELAND PHILADELPHIA HAVANA

## *More Light for Your Workmen*

# *"Golden Glow" Car Floodlighters*



Showing Car Illuminated by "Golden Glow" Projector

For illuminating your cars, track or overhead to facilitate repairs or construction work at night. They replace the common, inefficient bank of incandescent lamps with a powerful projection of "Golden Glow" light.

Write for catalog giving complete details.

Type CSB-128

# *"Keystone" Portable Lamp Guards*

Convincing evidence of the strength of Keystone Portable Lamp Guards

No lamp guard is really good unless it is so strong that a man may use it without "being careful." If he has to protect the lamp guard in the slightest degree it is detracting from his work.

Keystone Portable Lamp Guards are the strongest, being formed of Bessemer steel wires electrically welded together and heavily tinned. A workman can kick them, stand on them or throw them about without damaging the guard or lamp.

Get Keystone Portable Guards for your men. They want them.

***Write for bulletin showing many different types***

No. 12504

## ELECTRIC SERVICE SUPPLIES CO.

***Manufacturer of Railway Material and Electrical Supplies***

PHILADELPHIA
17th and Cambria Sts.

NEW YORK
50 Church St.

CHICAGO
Monadnock Bldg.

**Canadian Distributors: Lyman Tube & Supply Co., Ltd., Montreal, Toronto**

# More Servic

***Sept. 22***

# Electric Ra

**Will help you to sell more equipment if you have the right kind of equipment to sell**

What have you done, what are you going to do to help your electric railway customers give "More Service at Less Cost?"

You know the situation—able-bodied labor high and scarce, every kind of railway supplies skyrocketed in price and retarded in delivery; the heavy taxes of peace increased to the back-breaking point by the demands of war.

**And all these extra burdens in the face of declining revenues!**

***We stand ready to He***

**ELECTRIC RAILWAY JOURNA**

Member of Audit

# at Less Cost

## ssue

# vay Journal

## Manufacturers, it's up to you to prove at once how electric railways can give More Service at Less Cost

Each one of you surely has something that will enable electric railways to operate more safely, more efficiently and more satisfactorily.

Have you really done **everything** possible to prove this fact, or are you waiting for the railways to come to you?

Can't we bring you and the railways together in the market place at a time when they will be in the mood to listen eagerly to your story?

That market place is the "More Service at Less Cost" issue of the Electric Railway Journal. That time is September 22!

The more inspiring and the more convincing your message, and the message of your fellow-manufacturers in this issue, the greater the likelihood that the electric railway industry in its entirety will be ripe to consider every device that can lower their expenses and raise their earnings.

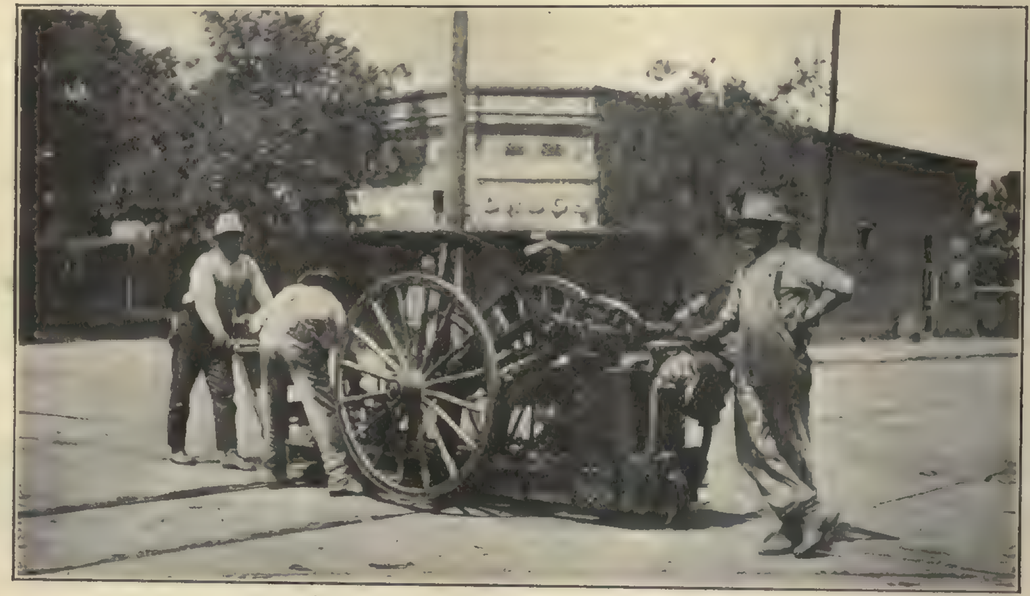
Let the nature of your message suit the nature of this issue and let the length of that message be in proportion to its importance.

***Vrite—Wire—Telephone***

**39 WEST 39th STREET, N. Y. CITY**

Circulations

# Efficient for the Company Easy and Simple for the Men



In our advertisement of last week we quoted from an address by Mr. B. R. Brown, Superintendent Maintenance of Way, figures which he presented on the work of the

# Reciprocating Track Grinder

in the service of the Dallas Railways Company.

Now an investigator inspecting the work of the Reciprocating Grinder in sending us the photograph from which the above illustration is made showing the Reciprocating Grinder at work in Dallas, says:

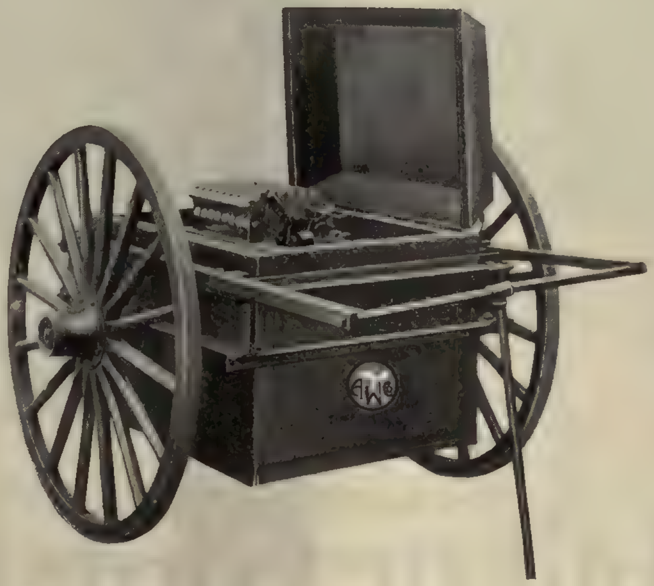
"I talked with the crew operating the machine and the timekeeper (to the left) says: 'It is sure easy to run and it's so simple that it never gives us the least trouble.'"

**Railway Track-work Co.**

**30th and Walnut Streets, Philadelphia, U. S. A.**

# Universal Welding Generator

**Highest Electrical Efficiency**



**Light Portable and Simple**

The purchase of one of these generators affords the railway the most favorable and economical arrangement for all welding purposes, including welding of copper bonds, as the Generator is especially designed to produce the proper current for all classes of work.

The costs of all work performed with these machines (and the accompanying equipment) is not only cheaper than with other equipment but assures results of the highest quality.

Write for detailed information and
sales arrangements regarding these

**Universal Welding Equipments**

to

**ATLANTIC WELDING COMPANY**
30 CHURCH STREET
NEW YORK

Trade Mark

Trade Mark

This illustration shows very graphically the condition of the old track of the Elmira Water, Light and Railroad Company. The track consisted of 8″ girder rail on wood ties, and sheet asphalt laid on old Belgian Block paving.

This picture and the plan of the new track, at foot of the page, give a direct answer to the question

# "T" Rail or Girder Rail

for city tracks. NELSONVILLE Patented Filler and Stretcher BRICK has brought the old reliable and economical "T" Rail "into its own" and no one knew the advantages of this combination better than the Elmira Railway Company when they laid their new tracks.

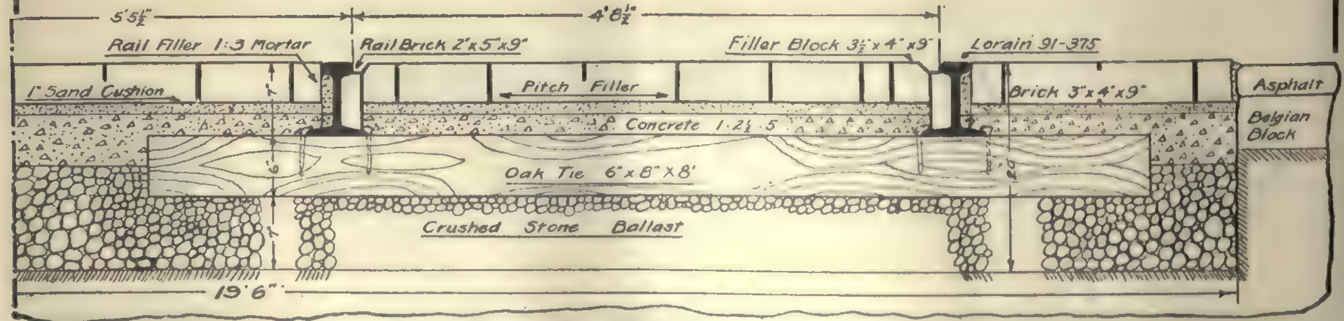
"Before beginning to place concrete, NELSONVILLE Filler Blocks were first laid against the web of the rails on the inside of the track—the bricks were then laid, using NELSONVILLE Stretcher Block next to the Filler on the inside of the track."

When next your tracks are being relaid think of the economical "T" rail and NELSONVILLE Filler and Stretcher brick TOGETHER—the ideal combination of rail and road, that eliminates "kick ups" and expensive paving renewals.

***Get Our Literature Today***

## THE NELSONVILLE BRICK CO.

**Nelsonville, Ohio**



**Reduced Power Consumption—Better Control of Car Speeds—Increased Safety—Correct Preservation of Headway**

Four very definite and important advantages (in addition to the saving of brake shoes and decrease of wear on equipment) which are produced by the use of

**The Arthur Power-Saving Recorder**

The motorman who is operating a car equipped with the Arthur Recorder does not attempt to notch up to unnecessary and excessive bursts of speed, because he knows that if he uses excessive speed he will simply have to keep his brakes on that much longer when forced to slow down or stop and thereby increase his record of braking time.

Neither does he take chances by following a preceding car too closely, for the same reason.

The motorman who is trying to make a good record on the Arthur Recorder simply must operate his car correctly, conservatively, intelligently and in accordance with the rules.

That kind of operation means safety for passengers and economy for the company.

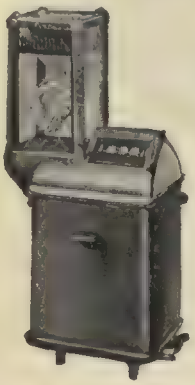
We can demonstrate to you that the Arthur Recorder is a tremendous help in achieving that kind of operation.

**The Arthur Power-Saving Recorder Co.**
**New Haven, Conn.**

***"Power wasted at the brake shoes is the true measure of the motormen's relative efficiency."***

**INTERNATIONAL MONEY-COUNTING FARE BOXES** used on prepayment cars in connection with International Single or Double Registers.

**INTERNATIONAL COIN AND METAL TICKET-COUNTING FARE BOXES** adapted for use on single or double-end prepayment cars.



**INTERNATIONAL COIN REGISTERS** which receive and count the money with visible and audible overhead registration.

**INTERNATIONAL COIN AND TRANSFER REGISTERS** which eliminate registers and rods, as both registers are mounted on a column over the fare box, and transfers are registered by a pull-cord.

# There IS an INTERNATIONAL to meet any fare situation

With the ever-growing variety of fare situations in this country from the six for a quarter metal or paper ticket to the 6, 7 and 8 cent fare, it would be absurd to claim universal adaptability for any one machine, but we do assert that we can provide an International fare collecting and fare registering combination best adapted to any individual fare situation.

## Here are a few International types

International motor-driven fare boxes, Boston's brilliant success.

International fare boxes, and registers to go with them.

International coin and transfer registers, hand or motor-operated, in which fare box and register constitute a single machine.

International coin, metal ticket and paper transfer register, with separate registration, like the C-24, which has been standard at Lincoln, Neb., since April 1, 1915.

International coin and metal ticket register with superimposed transfer register, our new type C-14, to take care of cash, metal tickets and transfers in one machine.

International portable registers for front-end fare collection on the street.

International station registers for prepayment areas.

## And now comes an International metal and paper register

Which receives paper tickets in the same hopper with metal coins, registering and returning the coins to the conductor while locking up the tickets.

What are your needs? We'll gladly fulfill them.

**The International Register Company**

**15 South Throop St., Chicago, Ill.**

**INTERNATIONAL SINGLE AND DOUBLE CAR REGISTERS** used by tens of thousands on cars where cash, tickets and transfers are registered with cords or rods through the hand or foot.

**INTERNATIONAL MOTOR-DRIVEN COIN REGISTERS,** which accelerate fare collection by relieving the conductor of turning the handle of the fare box and by immediate registration and return of money. The Motor-Driven type is recommended for all large cars operated through congested traffic areas.

# Get This Book on Arc Welding

Here is the most complete book ever published on this subject—written in terms that any man can understand—illustrated with hundreds of photographs showing what this wonderful process will do. Every man interested in shop and track repairs on street railway should have a copy.

**FREE**—If you are interested in this subject, write on your business letter head and you will receive a copy free.

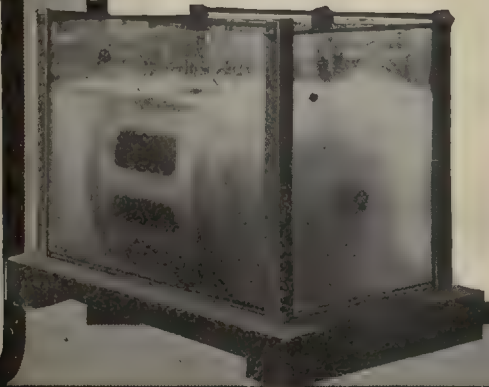
***Ask for Electric Welding Bulletin 104-J***

## What Editors Say

"'Electric Arc Welding' is certainly interestingly and attractively put up. The book lacks all the ear marks of the usual dry text book, which is prone to omit practical, up-to-the-minute illustrative material."
L. I. THOMAS, Editor, *FACTORY.*

"It is an admirable and surprisingly complete compilation of information on the status of arc welding, and it is especially valuable in that it compares the cost and effectiveness of electric welding with other methods." ALLEN M. PERRY, Editor, *ELECTRICAL WORLD.*

"You have so thoroughly covered the subject that there is nothing further to suggest."
A. O. BACKERT, Editor, *THE FOUNDRY.*



## The Lincoln Electric Co.

**Cleveland, Ohio**

New York City
(Singer Bldg.)
Buffalo
Syracuse

Chicago
Columbus
Detroit
Boston

Philadelphia
Pittsburgh
Charlotte, N. C.
Toronto, Canada.

Agencies in other principal cities

# Practical advice in the shop is trouble saved on the road

That is one of the many benefits secured through our free Expert Service. Read the following partial report from one of our Experts:

"The manager understands of course that if the bearings are in poor condition, even the best oil will not prevent trouble, but he is greatly perturbed by the hot boxes on their interurban cars. I have made *suggestions* to obviate this and bring about permanent betterments to the service, as follows:

"First—The work of rebabbitting journal brasses should be done at the main shop and by one man, so as to place the blame for poor work that is being done.

"Second—That a more liberal supply of new brasses be placed in service, as there are a number of the old ones that must be scrapped.

"Third—That as soon as possible rebabbitting of journal brasses be discontinued and the brass be allowed to wear to a scrapping point and then taken out of service.

"Fourth—On account of the high speed and weight of cars, there should be a more liberal renewal of high grade packing, as a large proportion of the journal packing now in service is short strands, and while it would prove satisfactory in slower service, it is not conducive to good operation under the present conditions.

"Also, I have *requested* them to discontinue a practice which, no doubt, has been the cause of a part of the journal trouble, and if continued it will ruin the journals. I refer to a block of wood that has been made in the form of a journal brass and when they have a hot journal they remove the brass and put in the block of wood with a sheet of emery cloth on its face and then run the car. The result is another hot journal, as it is impossible to remove all the emery from the journal without removing the journal box. Furthermore, any irregularity in the journal face or diameter will be aggravated by such a proceeding and new journal brasses will have so little surface in contact with the journal that the weight per square inch is out of all proportion to what it should be. This was proven by an inspection of journal brasses that had only been in service twenty-four hours. The journal box dust guards have not had the attention they deserve, and there are a number of journals without them."

Little things? Yes. But it was the viewpoint of a practical outside man that discovered them and realized their important effect on good service. That is what our Experts will do for you—point out the little faults, far reaching in their unfavorable effect on your service, that you have lived so close to that they have been unnoticed. And note that our man made only SUGGESTIONS and REQUESTS of the railway officials—no commands, no arbitrary demand that such and such a thing be done—it is up to the officials to accept or reject our recommendations. But the wide-awake railroad man is looking for practical advice. And we are equipped to give it to him.

**Galena-Signal Oil Co.**

**Franklin, Pa.**

# Columbia Brake Lever

## No. 5—

## Drilling

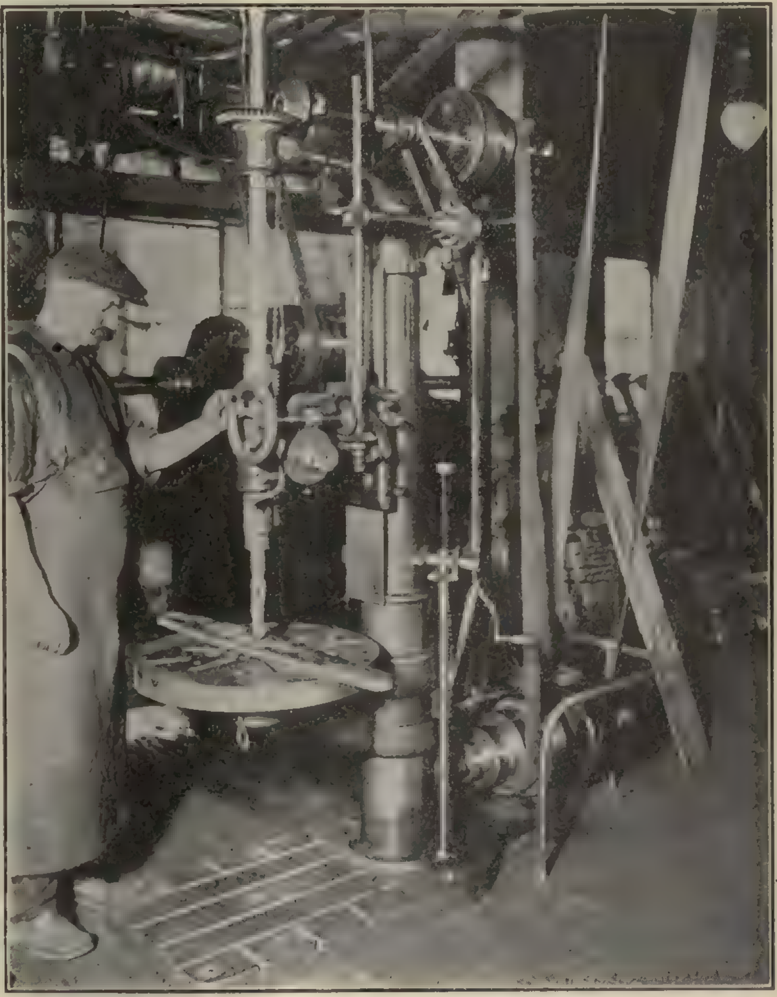
Another carry, as they say in the Adirondack Mountains, and our brake lever is ready for the finishing touches.

A short stay at the drill, a trip to the reamer and bushing machine, inspection and then, as No. 6 will show,

The brake lever will be ready for enrollment in the Army of Safety.

We make brake levers by the thousand, yet they are but one of scores of Columbia products.

Get acquainted with all of these!



### TOOLS

- Armature and Axle Straighteners
- Armature shaft straighteners
- Armature buggies and stands
- Babbitting molds
- Banding and heading machines
- Car hoists
- Car replacers
- Coil taping machines for armature leads
- Coil winding machines
- Pinion pullers
- Pit jacks
- Signal or target switches
- Tension stands

### CAR EQUIPMENT

- Armature and Axle Bearings
- Armature and field coils
- Bearings (Axle and Armature)
- Brush-holders and brush holder springs
- Brake, door and other handles
- Brake forgings, riggings, etc.
- Car trimmings
- Commutators
- Controller handles
- Forgings of all kinds
- Gear cases (steel or mall. iron)
- Grid resistors
- Third-rail shoe beams and accessories
- Trolley poles (steel) and wheels

**Columbia Machine Works & Malleable Iron Co.**

**Atlantic Ave. and Chestnut St., Brooklyn, N. Y.**

W. R. Kerschner Co., Inc., N. Y. Holden & White, Inc., Chicago F. F. Bodler, San Francisco

Collier Service

*Insures Greatest Return to the Car Advertiser*

The points of contact with the best ideas in advertising established by the Collier organization through the Collier men have made

COLLIER CAR CARDS

most consistently valuable to the advertiser and therefore most permanently profitable to the railway.

Collier Service in this case means that a particularly attractive kind of card developed for one city may be adapted to the needs of the same kind of advertiser in other Collier-served cities.

For example, a shoe card which increased business 20 per cent in seven months in one city may be placed at the disposal of a shoe dealer in each Collier-served city.

This interchange of business-bringing ideas, which means so much to the permanence and high standing of car advertising, is just one of the features of the car advertising service of

Barron G. Collier
INCORPORATED

Candler Building
220 West 42nd Street, New York City

# The First Book to Cover Broadly the Whole Field of Rate-Making

**To the consulting engineer, to the company official—to any man at all interested in the problems of rate-making, this book possesses exceptional interest and value.**

*Just Issued*

# Public Utility Rates

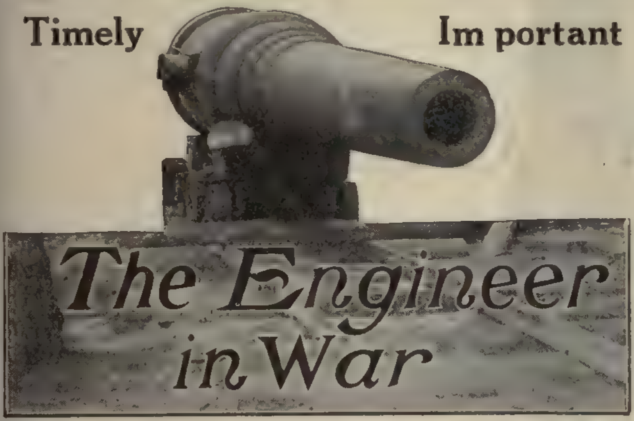
By **Harry Barker,** Associate Editor, Engineering News-Record, Member A.I.E.E. 387 pages, 6x9, $4.00 (English price 17s.) net postpaid.

This book covers fully yet clearly and concisely the whole question of rate-making.

The material it contains can be grouped into three main divisions—a comprehensive discussion of

(1) Such corporation and municipal activities as affect service and rates;
(2) The trend of public opinion and court and commission decisions; and
(3) The most important engineering and economic problems involved.

**Timely** **Important**



**By P. S. Bond**

Major, Corps of Engineers, U. S. Army, Member Am. Soc. C. E., Honor Graduate Army Field Engineer School, Graduate Army Staff College.

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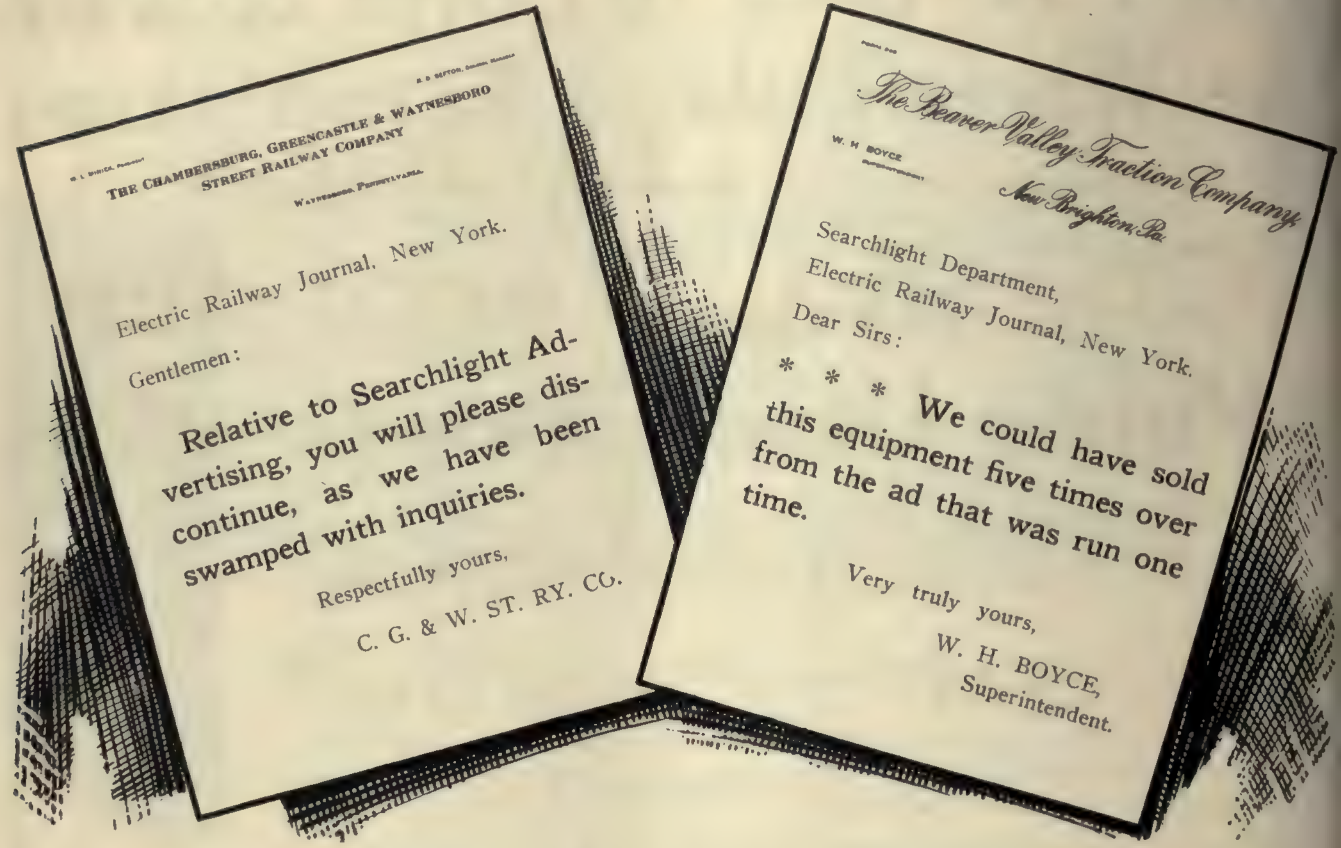

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This "Standing Time" is reduced by greater alertness in responding to starting signals, for example, so that the aggregate time available for coasting will be increased—a method

WITHIN THE COMPREHENSION OF THE MOTORMAN

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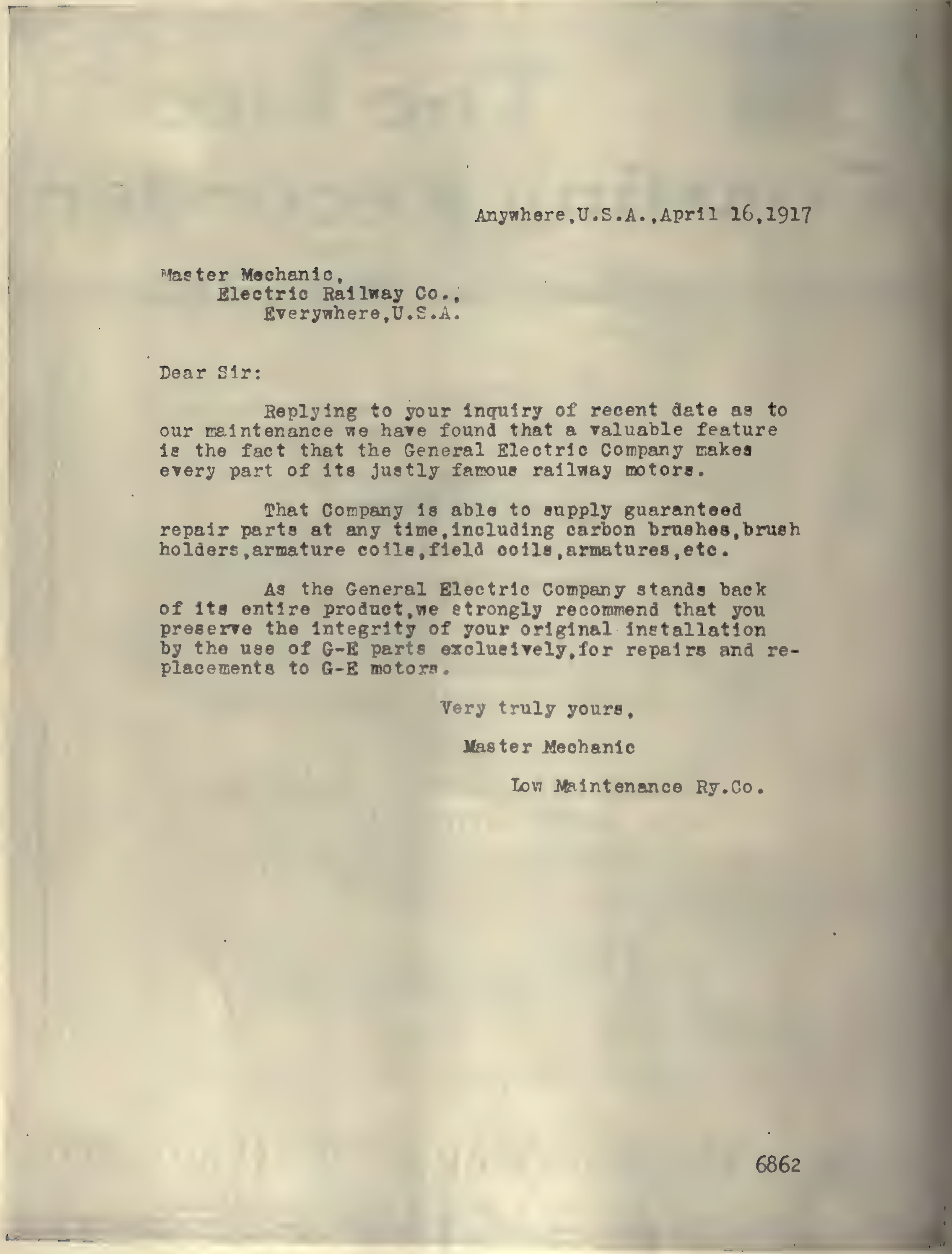

Anywhere, U.S.A., April 16, 1917

Master Mechanic,
Electric Railway Co.,
Everywhere, U.S.A.

Dear Sir:

Replying to your inquiry of recent date as to our maintenance we have found that a valuable feature is the fact that the General Electric Company makes every part of its justly famous railway motors.

That Company is able to supply guaranteed repair parts at any time, including carbon brushes, brush holders, armature coils, field coils, armatures, etc.

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Very truly yours,

Master Mechanic

Low Maintenance Ry. Co.

6862

# Electric Railway Journal

Published by the McGraw-Hill Publishing Company, Inc.
Consolidation of Street Railway Journal and Electric Railway Review

Volume 50 NEW YORK, SATURDAY, JULY 28, 1917 Number 4

## This Is as It Should Be

UNDER the caption "An Unreasonable Request" a prominent New Haven paper a few days since devoted an editorial to a defense of the Connecticut Company as to its refusal to carry free the soldiers encamped at the Yale Field. With the usual willingness of public bodies and individuals to spend other people's money, the Board of Aldermen had petitioned the company to carry the soldiers free, but the management did not feel justified in thus further reducing the already meager profit from its operation. The writer of the editorial in question explained that the company had already done more things of a patriotic nature than most people realized and gave examples to prove it. By way of analogy he said that, much as the newspaper would have liked to supply the soldiers with free copies, it was out of the question to do so. The answer to the free transportation suggestion, the writer continued, is a fair wage for the soldiers and their prompt payment. In these trying times no corporation or individual enjoys being put in the position of appearing to be unpatriotic. The public press has an excellent opportunity to prevent misunderstanding when such a condition comes about inadvertently, and the public as well as the vindicated will appreciate its courtesy in so doing.

## Scheduling the Work of the Way Department

TIME studies of work to be performed in industrial shops have been a striking feature of the progress made by American manufacturers during the past few years, but there is nothing inherent in the method which limits it to industrial plants. It is equally adapted to electric railway repair shops, as shown in the articles on the Portland (Ore.) shops published in our Maintenance Issues of 1916 and '17. The same general principles have now been applied in Denver to track work, and the results, as given in the leading article this week, seem eminently satisfactory. No work is begun until the principal details connected with it have been scheduled in advance by a planning board. The duration of the undertaking, the hours of work, the date of the receipt of materials, etc., are all determined so that the theoretical lost time is reduced to a minimum. The work then becomes one of dispatching the men and materials to the point of use, just as cars are dispatched in transportation service to pass at determined meeting points. Those who read the article on the Denver system will recognize many points of resemblance to the various systems of shop planning with which mechanical engineers are familiar in shop applications. There is the central authority or bureau, the checking of estimates, the routine following of the work through and the records of work completed and to be performed. In Denver the method described is not confined to the way department but applies to all engineering work, although most of the examples cited in the article this week relate to outside construction. Altogether the article is one which we believe will prove most helpful to railways in the economical conduct of their engineering departments.

## Efficiency Awards to All Employees

A GREAT deal of hard thinking has been applied to methods of rewarding motormen for better work. In the past many of these have been based on plans which have singled out only the highly skilled few, leaving the large majority discouraged over the prospect of ever attaining a "triple A" class. For instance, where awards are made on the basis of records shown by energy-checking devices, it is not uncommon for the awards to go only to the top-notchers, whereas men who are several points lower, often because of conditions beyond their control, get nothing—and nothing in any event is also the reward which the majority receive. Quite a different method has been pursued by some railways in dividing accident savings among all the men, either by an equal division or on some seniority or wage basis. It is this plan, rather than individual bonuses, which has worked out successfully on a property equipped with coasting recorders. When these devices were installed, the management frankly told the men that certain savings could be accomplished if the men would help. No promise of any kind of award was offered, but when a year's operation had shown a most gratifying saving, the wages of every man were voluntarily advanced 1 cent an hour. The men were advised that this increase had been made possible only through their co-operation. The result was an immediate jump in coasting efficiency and some plain talk to the low coasters by their fellow-motormen. The way the men on this road encouraged one another to coast speaks volumes for their loyalty to the management. While the example just quoted may appear unique of its kind, it shows that more may often be gained by interesting and rewarding the men as a whole than by restricting the bonuses to the few. The greatest gains to the railway must come from a high general average rather than from a few star performances and many poor ones. If all are to be interested, all should be rewarded.

## What Publicity Does to the Employees

THE head of a large electric railway system received a real mental jolt one day when a publicity man told him that an aggressive publicity policy would show its first and some of its best results in his own organization. He hadn't thought of publicity in that light. In fact, all the thinking he had done on the subject had been in connection with the probable effect of the printed word upon the car-riding public. He had overlooked the fact that it is just as important for the employees of a public utility to have a clear and honest understanding of the company's attitude on service and public relations as it is to establish that understanding with the people served. Without such mutual understanding trouble is inevitable. But, by the same token, once a company makes an honest effort to educate both its employees and the public to an appreciation of the kind of service it wants to give, good results are certain.

An incident that illustrates this point occurred recently in one of the big Eastern States. A certain traction company was the object of an attack by the newspapers. Among certain things it was charged that the cars were dirty, the windows gummy around the edges, etc. It was also alleged that the platform men were uncivil to passengers, that the officials could not be seen, and that their policy was of the "public-be-damned" sort.

Some of these things were true. But the managers were not of the "public-be-damned" type. They were keen in their sense of duty to the public and of the public's right. But their conductors and motormen were often uncivil, and their cars were not so clean as they should have been—a too economical carhouse man had been saving money.

When the charges were made the company placed cards in its cars saying: "This company intends to make a reputation for clean cars. We want your help."

Another card bore this inscription: "The life of a street car conductor is no bed of roses. He is human, but he is aware of his duty to be courteous to our passengers. Help him."

Now, what happened? The company put on some cleaners to keep the windows and cars clean. They had to live up to that notice. The windows of those cars glistened, as one of the officers of that company said, "like the Kimberley diamond."

Moreover, the publicity reacted on the men. With that "courtesy" car card staring him in the face, it was not so easy for the conductor or the motorman to be "short" with passengers. Unconsciously they began to absorb some of the company officials' spirit, and complaints concerning incivility declined with most pleasing speed. All of which points a simple but useful moral:

Your car cards, your bulletins and all your literature should be brought to the notice of all your men. They are a part of the company. It is their publicity as well as yours. Incidentally, the office boy, the chief clerk or the superintendent's office sometimes makes as many enemies for a company as the platform men. Let them see your publicity, too.

There is sometimes a feeling on the part of managers that the adoption of a publicity policy will cause too much attention to be focused on them. They do not want to get in the limelight. One manager once said he didn't want his name signed to car cards because "people would get sick of seeing it around so much." He was told that the very object was to make his name and his personality synonymous with good service and consideration for the public's rights. It put the subject to him in a new light.

Publicity, intelligently and persistently followed, increases the efficiency of a company to a marked extent. Every man in its employ knows that what he does is part of the company's public record. He is only human when he wants to have a good record. A company with enough employees imbued with this spirit can stand the full glare of the limelight, and publicity will inculcate this spirit.

Publicity itself is the most human thing in the world. If it is not human it is not worth anything. It must represent the real policies—they should be human—of the management of a company. When it does, and the public becomes acquainted with these policies, the company will get a fair and square deal. For the public really wants and means to be fair, and will be if it has an honest chance.

## Large Pinions on City Cars Not Only Useless but Costly

NOW that the search for economies in the electric railway field is so thoroughly under way, it might be well to call attention again to two well-known but somewhat neglected principles governing gear ratios for cars in city service. The first of these is that capacity for high maximum speed does not necessarily produce high schedule speed; in other words, a city car's ability to run fast is usually worthless as a time saver. The other principle is that the only effect of a low gear ratio, or the use of large pinions, is to provide high maximum speed, which has no value in city service, and that it provides this high speed at the expense of energy consumption and schedule speed, which have great value.

That these very definite laws governing gear ratios for city service should be disregarded to the extent that companies retain the numerous sixteen-tooth and seventeen-tooth pinions that are in operation to-day under congested traffic conditions may perhaps be due to the complication arising from the common custom of considering both distance and time elements in connection with the subject of city car movement. However, consideration of only the time element is quite feasible. Thus it may be said that the reason why high maximum speed is worthless in city service is that the stops come at intervals of only about forty seconds, or some other figure of that order. If a six-second stop is assumed, the net time interval devoted to movement of the car between stops becomes thirty-four seconds, and even with straight-line acceleration and braking at a rate of 1.5 m.p.h.p.s. the maximum speed that the car could attain would be 25.5 m.p.h. In other words, with thirty-four seconds devoted to car movement, only seventeen seconds could be allowed for acceleration, the remainder having to be reserved for braking in order to make the next stop. Even if the car was geared to make 30 m.p.h. and had motors large enough to accelerate at 1.5 m.p.h.p.s. with that gearing, it would be impossible to attain the 30-mile speed.

It is of interest now to consider, under the more or less academic assumption of straight-line acceleration, the effect of limiting the maximum running speed of the above assumed equipment by changing the gear ratio. If a pinion small enough to reduce the maximum speed from 30 m.p.h. to 22.5 m.p.h. should be installed, the rate of acceleration would obviously be increased to about 2 m.p.h.p.s. With a braking rate of 1.5 m.p.h.p.s., as before, and the same number of stops (which, it may be said, works out to about eight per mile), two alternatives are presented to the operator. Of these, one is that of retaining the same schedule speed and devoting the whole advantage gained by the smaller pinion to saving energy. In this case power may be shut off after 9.75 seconds of acceleration, allowing the car to coast for 12.25 seconds, and then applying brakes for twelve seconds to complete the run in the same time interval as before. The saving in energy will be 43 per cent, because of the greatly reduced time during which power is applied.

The alternative procedure is to carry acceleration up to 22.5 m.p.h., the limit set by the reduced pinion size, and then to coast. In this case the acceleration will last for 11.25 seconds, the coasting for about seven seconds and the braking for about 14.25 seconds, making the duration of the run 32.5 seconds instead of thirty-four seconds obtained with the large pinion. There will be a 34 per cent saving in energy under these conditions, but the major result is the saving of time, which amounts to an increase of about 4 per cent in schedule speed.

Here is a case where a decrease in a car's ability to run fast actually brings a faster schedule. Admittedly it is a highly special example, but the conditions required in practice to parallel it involve merely a frequency of stops sufficient to limit the average time for acceleration beyond resistance to four or five seconds—a not abnormal situation with congested traffic. This is reflected by the number of new cars that now are being fitted with fourteen-tooth and fifteen-tooth pinions when they are built, the latter pinion size being set by some engineers as an arbitrary minimum on the grounds of tooth strength.

However, the point that we wish particularly to emphasize is that of the desirability (in cases where stops are reasonably frequent) of changing over old city cars now fitted with pinions having sixteen or more pinion teeth. Under such circumstances no generalizations can be made in regard to the concrete results attained because of the many different factors involved, but a rough guide at least is afforded by consideration of the resistance losses during acceleration. The change, for example, even from a sixteen-tooth pinion to a fifteen-tooth pinion involves about 6 per cent less time spent on resistance, and this alone during the course of a year means a saving of about $20 per car. The capital expense involved is, of course, nothing at all, provided the change is made at the time when worn-out gears are being replaced. This is so near an approach to getting something for nothing that the industry can hardly afford to neglect it.

## Pay for Rainy Days Might Help to Hold Track Labor

GENERAL difficulty is being found in keeping a sufficient force of track laborers to carry on planned construction and maintenance work at anywhere near schedule. One Middle West road has been compelled to hire approximately 7000 laborers in the past year to maintain a force of 2000 to 2500. Whenever a rainy day occurs, and especially when two or three such days follow in succession, the next good-weather day usually finds the force depleted by two or three or a dozen men, depending on the size of the gang employed. This is a condition following rather naturally the abnormal nature of the times. There is too great a demand for labor for a workman to be content to sit idle for a day or two and lose his wage. The rule of "no work, no pay" among the laborers is a time-honored custom which many managers are loath to break; but would it not be to their best interests to give full or at least half pay for the rainy days, as an additional inducement in holding the men?

In canvassing the practices of a number of companies relative to their track labor, we find that it has become the custom on some properties to pay one hour's or two hours' time to the men on a completely rainy day for reporting on the job in the morning. This is to induce them to come out on the chance that by the time they reach the job the rain may have ceased. One company pays its laborers full time if a shower forces them off the work for an hour or two during the day but states that on a full rainy day the men do not as a rule report in the morning. Three of the companies canvassed pay their track men full time on completely rainy days, believing that this helps to keep the men on the job. Where this is done an effort is made to put the men at inside work and thus consume at least part of this rainy-day time.

As an alternative one way engineer suggests that it would do more good to increase the rate per hour than to allow the men time for idleness. The relative value of the two plans is hard to estimate, but we believe that to allow as near straight time as possible regardless of weather conditions will sound better to the average outdoor laborer than a few cents an hour additional pay. However, one or the other of these inducements is almost imperative. The railways cannot expect to pay materially lower wages than the contractors in competition with them for labor, and at the same time dock for bad weather as the latter do, and still keep any labor worth having.

THE PLANNING BUREAU AT WORK, WITH FLAG MAP AT LEFT

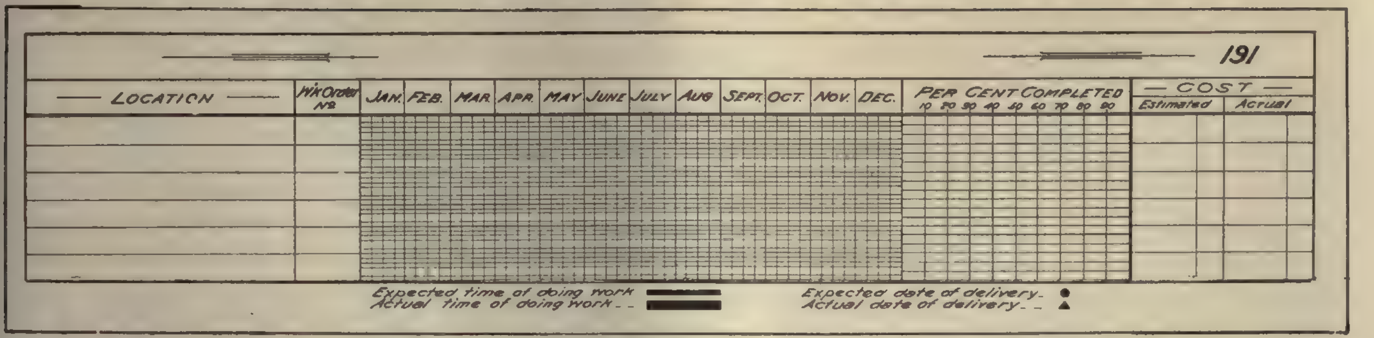
# Dispatching Work of Engineering Department

### System of Planning All Details, Timing Operations and Making a Central Bureau Responsible for All Work Gives Better Control of Men, Makes Possible Handling of Large Volume of Work and Releases Chief Engineer from All Minor Responsibility

WHAT IN EFFECT is a complete dispatching system for the work of every branch of the engineering department has been placed in operation by the Denver Tramway Company, of which Edward A. West is chief engineer. In brief, this system consists of a concentration of all the preliminary work and detail routine connected with every job with a small group of men centrally located. It substitutes a system which permits of definite and thoroughgoing supervision of every piece of work for the haphazard control so frequently found and relieves the foremen on the job of all the details of material delivery, tool provision, etc., so that they may devote their entire attention to getting the work of the job itself done. All work is scheduled in advance. The assignment of tools and materials, the movement of them to the job, the instructions as to what is to be done, who is to do it, how it is to be done, etc.—all are preplanned and timed, and this central group of men in control, called the planning bureau, acts as the dispatcher. The system thus eliminates lost time and duplication of work and gives the same control over all work, no matter what the volume in progress at one time may be. The big feature that stands out prominently is the fact that all work is started and carried on under written instructions.

PRELIMINARY to an understanding of the workings of the planning bureau of the Denver Tramway Company, it is interesting to point out the organization plan of the engineering department of the company. This is so constituted as to facilitate the systematic handling of any work in progress and to concentrate all routine and detail work of all the divisions of the department in this one planning bureau. The general supervision of work is administered by a committee of control of which the chief engineer is chairman and the four division heads, the superintendents of track, overhead and bonding, bridges and buildings, and power, are the other members. Directly responsible to the chief engineer and these four department heads is the planning bureau, at the head of which is the superintendent of planning, who is the ranking officer of the department in the absence of the chief engineer. The seven men in the planning bureau report to the superintendent of planning, and various other employees in the engineering department report to the division heads. One of the features of the organization is that there is always a man in training for every position and prepared to fill the vacancy in the next higher job.

A very large part of the work of the purchasing agent being closely allied to that of the engineering department, his office is located in the engineering department, although he reports to the general manager. For the same reason a group of clerks, who are responsible for the cost accounting and estimates and balance of stores records, etc., are located in the engineering department in order that they may be in close contact with it and facilitate the handing of work back and forth, although they report direct to the auditor


191
LOCATION
Wk Order No.
JAN. FEB. MAR. APR. MAY JUNE JULY AUG. SEPT. OCT. NOV. DEC.
PER CENT COMPLETED
10 20 30 40 50 60 70 80 90
COST
Estimated
Actual
Expected time of doing work
Actual time of doing work
Expected date of delivery ●
Actual date of delivery ▲

DISPATCHING ENGINEERING DEPARTMENT WORK—FIG. 1—RECORD FORM ON TRACING CLOTH FOR KEEPING TRACK OF ANNUAL BUDGET WORK

on another floor. This office arrangement brings into close association those employees whose work requires frequent intercommunication and thus generally facilitates the interworking of the departments.

### PLANNING BUREAU ORGANIZATION AND FUNCTIONS

The planning bureau has as its main functions the routing and scheduling of men, material, tools and conveyances to all jobs under way and projected. The central bureau, in addition to the superintendent of planning, includes a route clerk, an order-of-work clerk, a material clerk, a time-card clerk and a tickler clerk, who together constitute the planning board. These five clerks have the duties of analyzing, distributing, routing and following up all work which may be placed under their direction from the chief engineer's office in the case of large maintenance and construction work, from the division heads in case of routine repairs, operating jobs or emergencies, or from outside sources such as the tramway dispatcher, city officials or even the public in cases requiring emergency measures. These men are grouped around a large table, which supports a large bull wheel with numerous sections and pockets in which the various work-in-progress and work-ahead orders and all instructions or reports pertaining to them are filed. Upon this planning board the smooth working and complete preparation and following through of all work depend. All the routine and handling of details for the various work is assumed by this board, thus relieving the division heads and the chief engineer of everything but the general supervision work. Their duties considered separately are given later in this article, but all the positions are interdependent and each clerk is sufficiently familiar with the duties of the others so that the work of directing the men in the field will go on without interruption or delay despite the temporary absence of any. A summarization of their duties serves to picture the work controlled by the planning bureau and the scheme of supervision and preplanning of details.

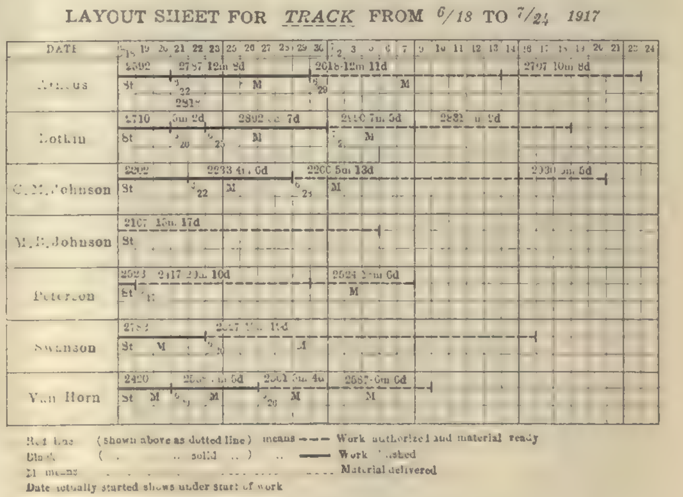
### SCHEDULE AND ROUTE CLERK

The schedule and route clerk is the member of the planning bureau who comes most frequently in contact with the men in the field. He is equipped with full information of all the correlated workings of the whole department and is thereby able to give most efficient directions to the men as they call in. He keeps in accurate touch with all work under way and is prepared from the information at his command to make an up-to-the-minute record of any job in progress. It is his particular function so to time various jobs and the various operations in each job that nothing will drag for want of the completion of some preliminary step. During each day he is in touch with all foremen at least once, learns the manner in which work is progressing and takes particular pains to see that delays are not being caused through lack of material, tools or work cars. He keeps a chart showing the location of each piece of utility equipment, such as motor cars, flat cars, dump cars, concrete mixers, air tampers, arc welders, bonding machines, track grinders, portable rock crushers, etc. He assigns the company automobiles to the various employees entitled to their use and keeps a record of this and the approximate time of the return of the car. He maintains a record on certain work schedule sheets which cover the principal jobs being done by the company and those done under contract, and these, with cost data which appear on the sheets, are brought up to date each week and blueprints are struck off for the information respectively of the general manager, chief engineer and division head. This form is shown in Fig. 1, but is shortened in the illustration to save space.

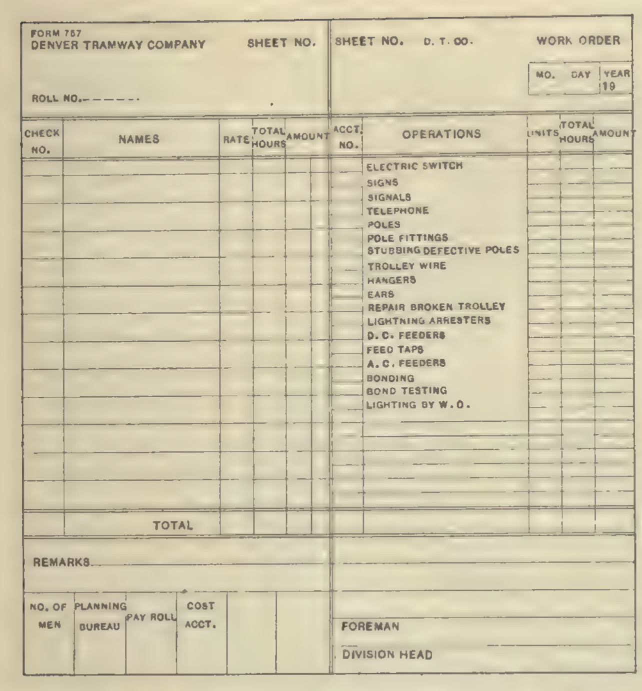
### LAYOUT SHEET

The schedule clerk also keeps the layout sheet, which consists of a large blank, Fig. 2, with a horizontal row for each foreman. The sheet is divided vertically into working days, Sundays and holidays being omitted, so that working time is represented by horizontal distance.

When the original work order is made up, the time



DISPATCHING ENGINEERING DEPARTMENT WORK—FIG. 2—LAYOUT SHEET OF DENVER PLANNING BUREAU



FORM 757
DENVER TRAMWAY COMPANY SHEET NO.
ROLL NO.——————

SHEET NO. D. T. CO. WORK ORDER

| MO. | DAY | YEAR |
|---|---|---|
| | | 19 |

| CHECK NO. | NAMES | RATE | TOTAL HOURS | AMOUNT | ACCT. NO. | OPERATIONS | UNITS | TOTAL HOURS | AMOUNT |
|---|---|---|---|---|---|---|---|---|---|
| | | | | | | ELECTRIC SWITCH | | | |
| | | | | | | SIGNS | | | |
| | | | | | | SIGNALS | | | |
| | | | | | | TELEPHONE | | | |
| | | | | | | POLES | | | |
| | | | | | | POLE FITTINGS | | | |
| | | | | | | STUBBING DEFECTIVE POLES | | | |
| | | | | | | TROLLEY WIRE | | | |
| | | | | | | HANGERS | | | |
| | | | | | | EARS | | | |
| | | | | | | REPAIR BROKEN TROLLEY | | | |
| | | | | | | LIGHTNING ARRESTERS | | | |
| | | | | | | D. C. FEEDERS | | | |
| | | | | | | FEED TAPS | | | |
| | | | | | | A. C. FEEDERS | | | |
| | | | | | | BONDING | | | |
| | | | | | | BOND TESTING | | | |
| | | | | | | LIGHTING BY W. O. | | | |
| | TOTAL | | | | | | | | |

REMARKS

| NO. OF MEN | PLANNING BUREAU | PAY ROLL | COST ACCT. | | |
|---|---|---|---|---|---|
| | | | | | |

FOREMAN
DIVISION HEAD

DISPATCHING ENGINEERING DEPARTMENT WORK—FIG. 3—TIME SHEET FILLED OUT BY TIME CLERK AS TRACK FOREMEN CALL IN

which this work will take is estimated in days. The schedule clerk then lays out the work order for a particular foreman by a horizontal red line (shown dotted in the reproduction), the length of which is the number of days which that work order will take. In this way no foreman is called upon to do two work orders at the same time. When the material is ready and taken to the job, the schedule clerk marks the layout for that job with a rubber stamp, "Mat. Del." (material delivered). At the completion of that work order the schedule clerk stamps "Comp." (complete) over the layout line. When the job is finished he draws a black line over the red line.

Briefly, then, the layout sheet shows all unfinished work by red lines. It also shows when a work order is ready for the foreman, when the foreman is through with his work, and when the job is finished, so that no further attention need be paid to it. If the estimate made of time required is low, this condition is shown by the black line falling behind the scheduled date; if too large, the black line gets ahead of the date.

All instruction sheets to the various members of the organization pass through the hands of the schedule and route clerk, as do also any requisitions for material in addition to that called for by work-order estimates or any change that may affect methods. By these means, his schedule shows a record of any interruptions and their frequency, due to alterations and additions not covered in original work order estimates. In brief, his position is that of a train dispatcher except that he is dispatching men, material and work instead of trains.

### THE TIME CLERK'S DUTIES

The time clerk of the planning bureau makes up the time record of all employees of the engineering department, thus relieving the various foremen of this detail work. The foremen simply call in each morning and give the work-order number on which they are assigned and the number of men working. The time clerk then carefully checks over this information to see that no time is turned in for any work not covered by an instruction sheet properly approved in advance by the superintendent of planning, except in cases that require emergency measures, such as line trouble, track trouble, fires, wrecks, etc. These time sheets, of which a typical one is shown in Fig. 3, are also checked against the work order, and any work shown as performed that was not covered in the original work-order estimate is questioned and brought to the attention of the superintendent of planning. The latter, after investigating, may approve it, if it is of no consequence, or he will probably request a revised work order to cover this additional work.

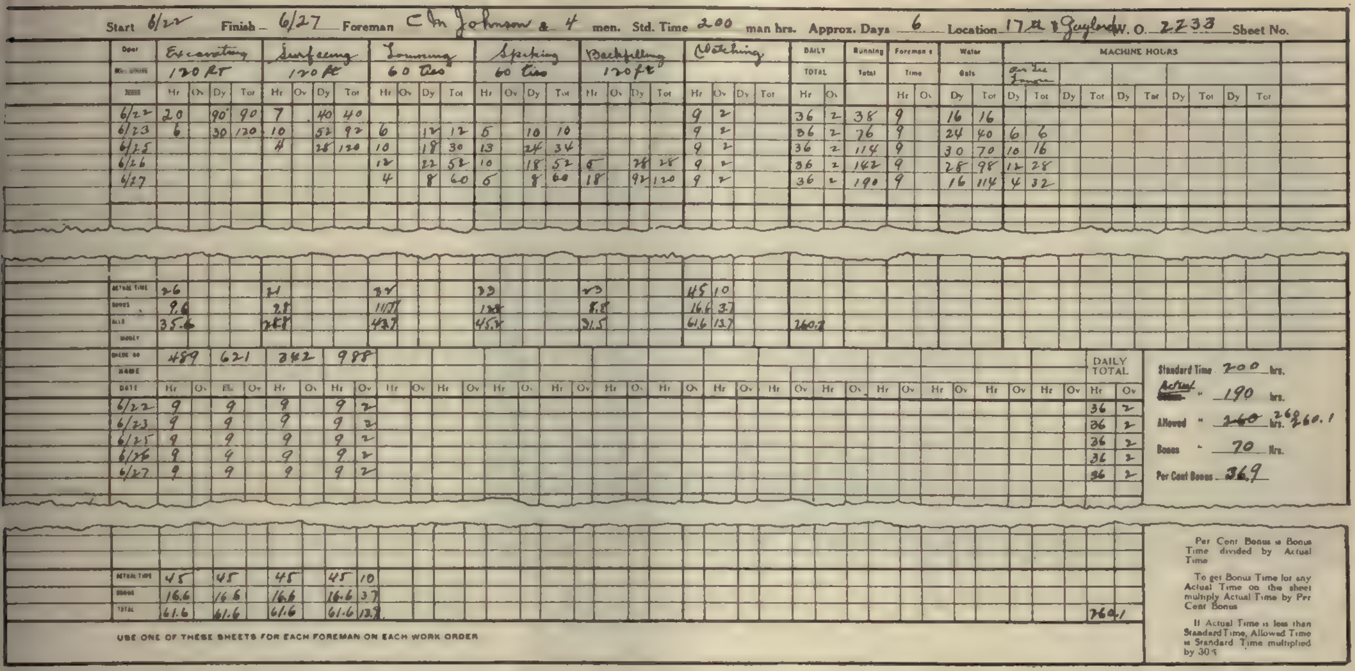
The time clerk and his assistants are also responsible for the proper distribution of labor charges. This requires careful attention and handling in order that the labor may be charged to the proper work order with proper distribution. Instances where more men are being worked on a job than the estimate calls for are caught in this check by the time clerks, and the matter of overtime charges is also carefully checked and a list of these made up daily for the chief engineer, showing all work requiring overtime and the amount, together with the reason for this overtime.

A separate time sheet is made out for each foreman for each work order (Fig. 4). This time sheet has a row for each day worked, and a red line (shown solid black in the reproduction) is drawn below the day when the work should be completed. If time is turned in below the red line, it automatically calls attention to the fact that that work order is taking too long. The upper part of the sheet shows the distribution of time to various operations on the work order, the lower part shows the total time for each man who worked on that work order. The upper part shows the cumulative total of amounts finished on each operation and the time which special equipment was used. Hours only are carried on the time sheet.

Each man's time is posted daily on the pay-roll sheet. At the completion of a pay period the labor distribution is extended at a gang rate for each class of labor and sent in to the cost department. At the completion of the work order a bonus time allowance is figured, and distributed among the various operations and among the men, proportionately to the actual time worked.

### ORDER-OF-WORK CLERK'S DUTIES

The order-of-work clerk of the planning bureau assigns the "next" job to be done by the various gangs and workmen. This involves the necessity for a very close observation of the information which the schedule and route clerk has as to the progress of work. If the chief engineer has no particular knowledge which fixes a date for the completion of certain work, then the order-of-work clerk arranges for such a date, taking into consideration the various items which enter into this as elements. Through his constant contact with the progress of work and from time studies which are constantly being made, this clerk is able to determine approximately the length of time required to do any certain job and is therefore able to place a date for the beginning and ending of work on any particular job. With this determined, he fills out instruction sheets for the planning board for each operation involving a separate set of workmen, gangs or conditions. These instruction sheets cover the work order or account num-



Start 6/22 Finish 6/27 Foreman C M Johnson & 4 men. Std. Time 200 man hrs. Approx. Days 6 Location 17th & Gaylord W. O. 2233 Sheet No.

| Oper | Excavating | | | | Surfacing | | | | Tamping | | | | Spiking | | | | Backfilling | | | | Catching | | | | Daily Total | | Running Total | Foreman's Time | | Water Gals | | Air Tie Tamper | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 120 ft | | | | 120 ft | | | | 60 ties | | | | 60 ties | | | | 120 ft | | | | | | | | | | | | | | | | |
| | Hr | Ov | Dy | Tot | Hr | Ov | Dy | Tot | Hr | Ov | Dy | Tot | Hr | Ov | Dy | Tot | Hr | Ov | Dy | Tot | Hr | Ov | Dy | Tot | Hr | Ov | | Hr | Ov | Dy | Tot | Dy | Tot |
| 6/22 | 20 | | 90 | 90 | 7 | | 40 | 40 | | | | | | | | | | | | | 9 | 2 | | | 36 | 2 | 38 | 9 | | 16 | 16 | | |
| 6/23 | 6 | | 30 | 120 | 10 | | 52 | 92 | 6 | | 12 | 12 | 5 | | 10 | 10 | | | | | 9 | 2 | | | 36 | 2 | 76 | 9 | | 24 | 40 | 6 | 6 |
| 6/25 | | | | | 4 | | 28 | 120 | 10 | | 18 | 30 | 13 | | 24 | 34 | | | | | 9 | 2 | | | 36 | 2 | 114 | 9 | | 30 | 70 | 10 | 16 |
| 6/26 | | | | | | | | | 12 | | 22 | 52 | 10 | | 18 | 52 | 5 | | 28 | 28 | 9 | 2 | | | 36 | 2 | 142 | 9 | | 28 | 98 | 12 | 28 |
| 6/27 | | | | | | | | | 4 | | 8 | 60 | 6 | | 8 | 60 | 18 | | 92 | 120 | 9 | 2 | | | 36 | 2 | 190 | 9 | | 16 | 114 | 4 | 32 |
| Actual Time | 26 | | | | 21 | | | | 32 | | | | 33 | | | | 23 | | | | 45 | 10 | | | | | | | | | | | |
| Bonus | 9.6 | | | | 7.7 | | | | 11.7 | | | | 12.2 | | | | 8.8 | | | | 16.6 | 3.7 | | | | | | | | | | | |
| Alld | 35.6 | | | | 28.7 | | | | 43.7 | | | | 45.2 | | | | 31.5 | | | | 61.6 | 13.7 | | | 260.1 | | | | | | | | |
| Weekly | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |

| Order No. | 489 | | 621 | | 342 | | 988 | | Daily Total | |
|---|---|---|---|---|---|---|---|---|---|---|
| Name | | | | | | | | | | |
| Date | Hr | Ov | Hr | Ov | Hr | Ov | Hr | Ov | Hr | Ov |
| 6/22 | 9 | | 9 | | 9 | | 9 | 2 | 36 | 2 |
| 6/23 | 9 | | 9 | | 9 | | 9 | 2 | 36 | 2 |
| 6/25 | 9 | | 9 | | 9 | | 9 | 2 | 36 | 2 |
| 6/26 | 9 | | 9 | | 9 | | 9 | 2 | 36 | 2 |
| 6/27 | 9 | | 9 | | 9 | | 9 | 2 | 36 | 2 |

Standard Time 200 hrs.
Actual " 190 hrs.
Allowed " ~~260~~ hrs. 260.1
Bonus " 70 hrs.
Per Cent Bonus 36.9

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Actual Time | 45 | | 45 | | 45 | | 45 | 10 | | |
| Bonus | 16.6 | | 16.6 | | 16.6 | | 16.6 | 3.7 | | |
| Total | 61.6 | | 61.6 | | 61.6 | | 61.6 | 13.7 | 260.1 | |

USE ONE OF THESE SHEETS FOR EACH FOREMAN ON EACH WORK ORDER

Per Cent Bonus is Bonus Time divided by Actual Time

To get Bonus Time for any Actual Time on the sheet multiply Actual Time by Per Cent Bonus

If Actual Time is less than Standard Time, Allowed Time is Standard Time multiplied by 30%

DISPATCHING ENGINEERING DEPARTMENT WORK—FIG. 4—FOREMAN'S TIME SHEET SHOWING DISTRIBUTION OF TIME

ber and location of the job, the foreman's name and the number of workmen who are to do the particular operation involved as shown in the work order estimate, the date the order for work was received, the time the operation is scheduled to start and, finally, the time in hours or days estimated for the gangs to complete each operation.

These completed instruction sheets are filed in the bull wheel pictured in Fig. 5 in the tier of pockets assigned to the particular foremen who will perform that work, and these instruction slips are filed in the order of the date received. In the case of rush jobs, the instruction sheets are, of course, placed on the board ahead of the regular jobs. At least to the extent of 20 per cent more than the various gangs of workmen can handle, jobs are kept scheduled ahead. With such work as requires an instruction sheet to go out periodically, these sheets are hektographed and a number of them placed in the tickler file to come out two days before the date wanted. This applies to such matters as bi-monthly cleaning and sweeping out of stations and waiting rooms on interurban lines, etc.

### MATERIAL-ORDER CLERK'S DUTIES

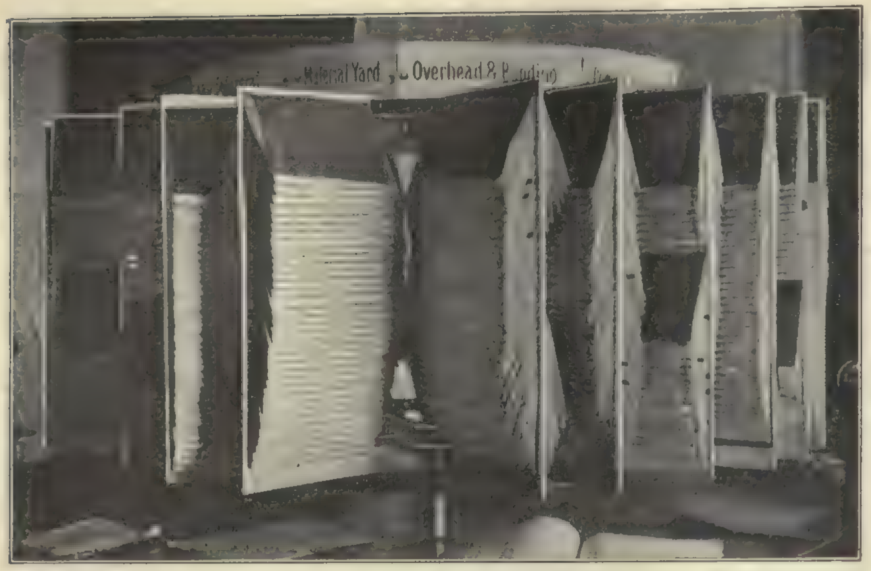
The material-order clerk of the planning bureau makes up the material requisitions for all divisions of the engineering department. With the detail work orders before him on the bull wheel and the dates on which work is to begin plainly in evidence, he assigns the necessary material and tools to the job and has them there by the end of the day previous to the beginning of work. This may require a number of instruction sheets issued to several of the traffic men who collect the material from perhaps several places on the company's property. But the specific duty of this clerk is to see that the material is delivered on the job and ready for use when required. This function, of course, makes it necessary for the clerk in charge to be familiar with the amount of material of the various varieties on hand at any time and the status of orders for additional material for delivery at such time as will provide for the need. Material for all jobs is made ready in advance of the time it is called for by the material transit men, and the prearrangement for this, of course, falls to the material-order clerk to do. This clerk also is charged with crediting various jobs with material removed and any material left over. Before marking any job complete, he checks it over for unused and removed material and compares his information with that of the cost clerk and balance-of-stores clerk to make sure that credit memoranda have been put through showing proper debit and credit.

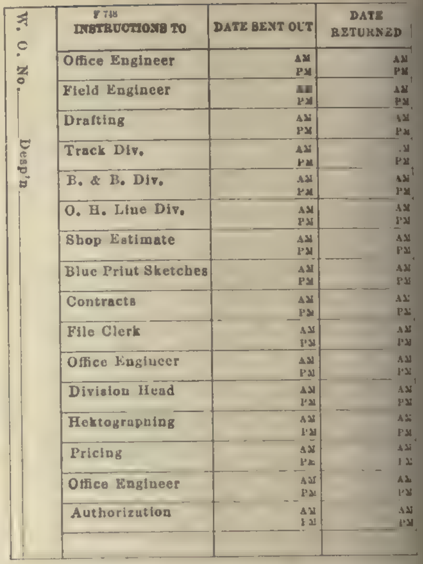
A copy of all requisitions for material comes back through the planning bureau and is checked by the material clerk. If requisitions for material in addition to that originally assigned to any job come through in sufficient number to have any significance individually or because of the large number of them, the material clerk sends a notice of this to the superintendent of planning with the notation of the number of requisitions above the original allowance. The latter then passes on these or checks up to find out the cause. This gives an absolute check on materials going into any job and will cause an investigation and bring reasons to the chief engineer when there is any considerable overrun.

The material clerk also keeps a record of all auto and team hire and from this record checks the monthly bills before they are sent to the auditor for payment. He maintains a record of all cases of transfer or switching of materials and supplies and is able to check these bills monthly.

### DUTIES OF TICKLER AND OTHER CLERKS

Other employees reporting to the superintendent of planning are a tickler clerk, who is responsible for keeping matters progressing through the hands of the various members of the engineering organization as rapidly as each completes his part and for bringing up all matters at the proper time for consideration; a material yard clerk, the material transit men and the tool foreman. The office engineer, also reporting to the super-




W. O. No.____ Desp'n____

| F 718 INSTRUCTIONS TO | DATE SENT OUT | DATE RETURNED |
|---|---|---|
| Office Engineer | AM<br>PM | AM<br>PM |
| Field Engineer | AM<br>PM | AM<br>PM |
| Drafting | AM<br>PM | AM<br>PM |
| Track Div. | AM<br>PM | AM<br>PM |
| B. & B. Div. | AM<br>PM | AM<br>PM |
| O. H. Line Div. | AM<br>PM | AM<br>PM |
| Shop Estimate | AM<br>PM | AM<br>PM |
| Blue Print Sketches | AM<br>PM | AM<br>PM |
| Contracts | AM<br>PM | AM<br>PM |
| File Clerk | AM<br>PM | AM<br>PM |
| Office Engineer | AM<br>PM | AM<br>PM |
| Division Head | AM<br>PM | AM<br>PM |
| Hektographing | AM<br>PM | AM<br>PM |
| Pricing | AM<br>PM | AM<br>PM |
| Office Engineer | AM<br>PM | AM<br>PM |
| Authorization | AM<br>PM | AM<br>PM |
| | | |

DISPATCHING ENGINEERING DEPARTMENT WORK—FIG. 5—BULL WHEEL CARRYING INSTRUCTION SHEETS FOR EACH JOB, AND FIG. 6—PINK TICKLER FOLLOW-UP FORM

intendent of planning, sizes up each job as proposed to determine roughly what work will be necessary and then issues instruction sheets to the various men in the departments interested, asking for the detailed information on which to base cost estimates and work-order instructions for the various operations involved.

### How the Engineering Department Works

All construction or large maintenance jobs to be done by the engineering department are initiated by the chief engineer. This introduction of work may come about through the approval of recommendations made by division heads, through requests for certain work by the management, through inspection by the chief engineer, as the result of inspection reports from the field which may show the necessity for doing certain work, or through work-order estimates made up by the office engineer from the yearly budget. Small maintenance or emergency work is handled through the planning bureau by the issuance of instruction sheets directly to the parties concerned, or in some instances where this seems necessary by the issuance of work orders, which must then be approved by the chief engineer or superintendent of planning.

After any job has been approved by the chief engineer, the order-of-work clerk in the planning bureau takes out a work-order number and places it, together with a brief description of the work to be done, on a pink work-order tickler, Fig. 6. This sheet is then placed in the work-ahead file in the bull wheel where the jobs are arranged numerically, and is used by the tickler clerk in the planning bureau to follow up the various steps necessary before a work-order estimate is written up and authorized. After the work-order estimate is authorized, it takes the place of the pink work-order tickler in the bull-wheel pocket.

The order-of-work clerk issues instruction sheets to the office engineer to make up a work order, and this is followed up daily by the pink work-order tickler. The work involved in a particular job may require information from several divisions in order to make up the estimate. To secure this the office engineer then writes instruction sheets requesting field or drafting work, and these sheets are routed to the division heads or individuals performing the work by the order-of-work clerk in the planning bureau.

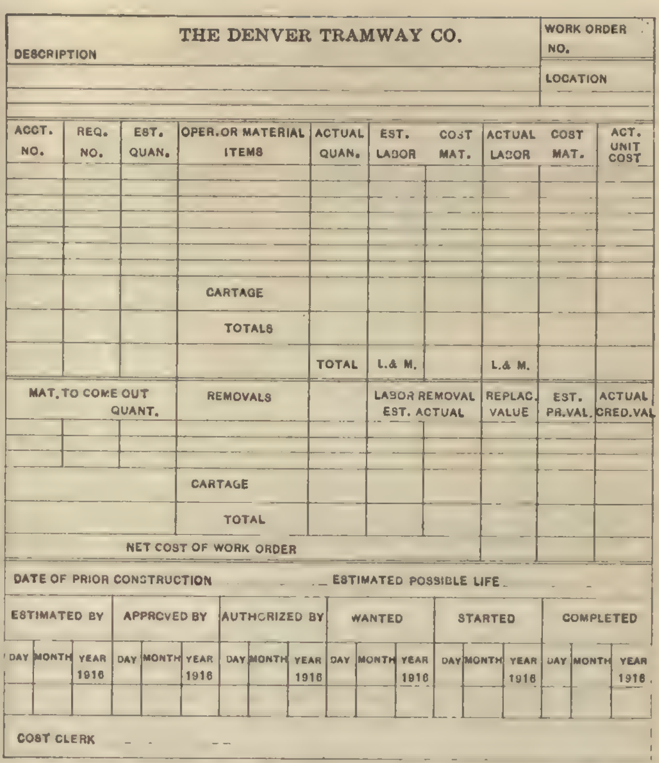
When all data, including necessary sketches and blueprints, have been received by the office engineer in reply to his instruction sheets, he proceeds to make up a preliminary work-order estimate, Fig. 8. All labor items are priced, and on the back of a sheet giving instructions to the planning board the first and second choice of foremen to do that work is indicated. The board is also told the number of men to be used and the estimated time required to do the job. The office engineer designates the number of copies of the work order which will be required, including a copy for each foreman involved and a copy for the storekeeper. This preliminary work order is then checked with the division heads concerned. On all work orders a credit estimate to take care of the original installation value of the material estimated to come out is also included. When everything is ready for typing, the office engineer initials the order and places it in his outgoing mail drawer.

The tickler clerk, collecting the interplanning bureau mail, notes the signature of the office engineer on the preliminary copy, retains the pink sheet on top and passes the work order to the file clerk for typing. At the same time he files any sketches or blueprints attached to the preliminary work order in the tickler blueprint drawer assigned to that job. After being typed, the preliminary copy is clipped to the typed copy and both are sent back to the tickler clerk's basket and thence to the office engineer's incoming drawer. The latter checks and initials the typed copy in the upper part of the "estimated by" space, fills in the date wanted and returns it to the planning board.

When properly signed by the division head the work is forwarded to the auditing department for hektographing. Upon its return to the planning bureau it is sent to the balance-of-stores clerk, who adds the prices of the material items. With the labor and material estimated costs totaled, the balance-of-stores clerk returns it to the planning bureau, where the sketches or blueprints which were held in the tickler blueprint drawer are attached, and the whole file is sent to the office engineer. With the completion of each step in the formulation of a proper work order as noted above, the matter is returned to the tickler clerk in the planning bureau, who immediately charges it out to the next person concerned and delivers it to him. Thus by referring to the pink slip, Fig. 6, it is possible to see at any time exactly how far along the work order is and in whose possession it is at that moment.

Each work order for $25 or more, together with a letter of transmittal, Fig. 7, written by the office engineer showing the title of the work order and the nature of the work covered, the reasons why the work is necessary and a distribution of the total expense, is forwarded to the general manager. The letter of transmittal also contains a statement made up by the office engineer in conjunction with the auditor, covering the retirement of property and how that retirement is to be taken care of on the books. If the work covered was included in the annual budget, this is mentioned. When completed, the tickler clerk passes the work order, together with the letter of transmittal, sketches, blueprints, etc., attached, to the chief engineer, who approves it and forwards it to the general manager for authorization, except for such work as the chief engineer has final jurisdiction over.

After authorization the work order is returned to the planning bureau and the tickler clerk places it in the incoming mail drawer of the superintendent of planning. When the latter has taken note of it he places it in the tickler clerk's basket again, and the latter passes it on to the schedule clerk, who lifts the pink tickler copy and gives proper distribution to the various copies of the work order. The order-of-work clerk stamps the planning bureau's copy of the work order with the time stamp and writes instruction sheets covering each operation called for in the work order. These operations may involve the necessity for instructions to the surveyors, the material yard foreman, the tool and equipment foreman, the work-car crews, the grading crews and teams, etc. In addition, instructions arrange for the assignment of men and gangs, the prompt cleaning up of the job, the return of all unused and removed material, the final inspection of work, advice to the statistician who has a copy of the work order that the work is completed, and for a final checking of quantities by the field engineer.



THE DENVER TRAMWAY CO.

DESCRIPTION

WORK ORDER NO.

LOCATION

| ACCT. NO. | REQ. NO. | EST. QUAN. | OPER. OR MATERIAL ITEMS | ACTUAL QUAN. | EST. LABOR | COST MAT. | ACTUAL LABOR | COST MAT. | ACT. UNIT COST |
|---|---|---|---|---|---|---|---|---|---|
| | | | CARTAGE | | | | | | |
| | | | TOTALS | | | | | | |
| | | | | TOTAL | L.& M. | | L.& M. | | |

| MAT. TO COME OUT QUANT. | REMOVALS | | LABOR REMOVAL EST. ACTUAL | REPLAC. VALUE | EST. PR.VAL. | ACTUAL CRED.VAL |
|---|---|---|---|---|---|---|
| | CARTAGE | | | | | |
| | TOTAL | | | | | |
| NET COST OF WORK ORDER | | | | | | |

DATE OF PRIOR CONSTRUCTION ESTIMATED POSSIBLE LIFE

| ESTIMATED BY | | | APPROVED BY | | | AUTHORIZED BY | | | WANTED | | | STARTED | | | COMPLETED | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| DAY | MONTH | YEAR 1916 | DAY | MONTH | YEAR 1916 | DAY | MONTH | YEAR 1916 | DAY | MONTH | YEAR 1916 | DAY | MONTH | YEAR 1916 | DAY | MONTH | YEAR 1916 |

COST CLERK

DISPATCHING ENGINEERING DEPARTMENT WORK—FIG. 8—WORK ORDER ESTIMATE MADE UP BY OFFICE ENGINEER. SPACE ON BACK IS LAID OUT FOR SKETCH OF JOB AND SPECIAL INSTRUCTIONS TO PLANNING BUREAU AND FOREMEN

THE DENVER TRAMWAY COMPANY
ENGINEERING DEPARTMENT

Subject:

Letter of Transmittal Accompanying Work Orders Calling for an Expenditure of $25.00 or over.

Mr. F. W. Hild, Gen'l Mgr.

Dear Sir:

1. Attached hereto please find........Work Order........ made out to cover the cost of

2. The work outlined above is necessary on account of

3. The distribution of the cost (debit estimate) is as follows:

Abandonment Maintenance
Betterment Replacement
Depreciation

4. The net "cash" required is $.......................

5. The probable life of the proposed installation is....yrs.

6. From the credit estimate retirement of property constructed in ................ is taken care of as follows:

Replacement value of
Property removed............ Credited to..............
Salvage value of
Material removed............ Credited to..............
Difference ................ Charged to..............

Respectfully,

Distribution Approved:

.................................
Chief Engineer

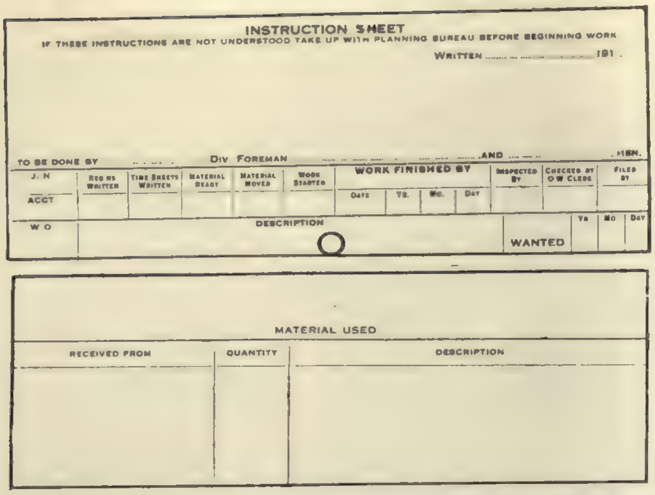
Cost Clerk for
Auditor

DISPATCHING ENGINEERING DEPARTMENT WORK—FIG. 7—STANDARD LETTER OF TRANSMITTAL OF WORK ORDER TO GENERAL MANAGER FOR AUTHORIZATION

When the instruction sheets have been written up and this has been noted on the work order, the order-of-work clerk passes the work order on to the material clerk in the planning bureau, who immediately orders and assembles the necessary material for that job. No work is started until the planning bureau has a properly authorized work order made out in sufficient detail so that it can intelligently order the necessary material and arrange for the best scheduling of work cars, crews, gangs, tools, etc. Then, the day in advance of the time work is scheduled to begin on a certain job, the instruction sheets for the various operations involved in the actual work are sent out in proper sequence and the work goes on with one dependent operation following another or with independent operations going on simultaneously when this is advantageous. In other words, all tools and materials reach the job just when they are needed, just as a train arrives at a passing point or the various units of a train arrive at the make-up point—a matter of dispatching.

### GRAPHICAL RECORD OF WORK IN PROGRESS

As a means of picturing at a glance all the information contained in the bull wheel as to what jobs are in progress and where, the work is plotted out on a large map in the planning bureau office shown at the left in the engraving at the head of this article. Early each morning the construction foremen report to the planning bureau office as to the place they are working, the order number, the number of men working and whatever special equipment they have. This information is



INSTRUCTION SHEET

IF THESE INSTRUCTIONS ARE NOT UNDERSTOOD TAKE UP WITH PLANNING BUREAU BEFORE BEGINNING WORK

WRITTEN .................. 191 .

TO BE DONE BY ........ DIV FOREMAN .................. AND ...... MEN.

| J. H | REQ NS WRITTEN | TIME SHEETS WRITTEN | MATERIAL READY | MATERIAL MOVED | WORK STARTED | WORK FINISHED BY | | | | INSPECTED BY | CHECKED BY O W CLERK | FILED BY |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | DATE | YR. | MO. | DAY | | | |
| ACCT | | | | | | | | | | | | |

| W O | DESCRIPTION | WANTED | YR | MO | DAY |
|---|---|---|---|---|---|
| | ○ | | | | |

MATERIAL USED

| RECEIVED FROM | QUANTITY | DESCRIPTION |
|---|---|---|
| | | |

DISPATCHING ENGINEERING DEPARTMENT WORK—FIG. 9—WORK ORDER INSTRUCTION SHEET, FRONT AND BACK. CIRCLE AT BOTTOM OF FRONT INDICATES WORK IN PROGRESS ON THAT JOB

checked by the schedule clerk and taken down on a certain form by the tickler clerk and is later transferred to the map already mentioned and called the flag map. This map shows all lines of the tramway system as well as all buildings, substations, power plants, carhouses, sidings on the interurban lines, etc. When flags are placed on this map at the location a gang is working, it is possible to see at a glance approximately how much work is going on at any one time, its nature and where it is being done. The flags are of different colors to indicate different types of work. For instance, green indicates track work; red, overhead work; yellow, carpenter or bridge and building work, and purple, material yard work. The name of the foreman is written on the tag, together with the work order number and the number of men working under him. Whenever any foreman moves from one job to another he calls in to the planning bureau and the tag is then changed on the map. This map is brought up to date each day.

### THE PLANNING BUREAU BULL WHEEL

In the center of the large table around which the four clerks of the planning board work is the large bull wheel, Fig. 5, to which frequent reference has been made and on which are placed all the work-ahead and work-in-progress orders. These are divided up among the several departments and again among the several foremen. When complete the work orders are slipped in a little celluloid pocket and thereafter every instruction sheet or notation of any kind pertaining to that work order is placed in this pocket also. The instruction sheets are made out so that the work order number and a brief description, the date work is to begin and be completed, etc., appear at the bottom edge. This narrow strip with a brief description of the job projects below the pocket above on the bull wheel and makes it readily possible for the clerks, looking for any particular job, to glance down the bottoms of the various pockets and quickly pick out the work order sought. When work has been started on any job, the original instruction sheet is taken off and forwarded, leaving the duplicate showing. This blank, Fig. 9, has a red circle printed at the bottom edge, and this circle makes it very simple to pick out the work orders on which work is in progress.

When a work order has been placed in the bull wheel for work ahead and the material clerk has arrange for all material and tools necessary for that particula job and has received notification back that this is al ready, he places a small red flag on the pocket containing this work order. This makes a ready reference t what jobs are all ready to go ahead with among th work-ahead items. On jobs requiring no material, th material clerk puts a green flag on the pockets to indicate this fact.

Among the advantages of the close check of all wor in progress which is maintained by the planning burea clerks is the fact that the cost from day to day i turned in to the cost department and added to the wor order estimate, and when this actual cost is approachin or has reached the estimated cost, and the work is no yet near completion, a warning is immediately sent t the chief engineer on the blank shown in Fig. 10. Thi of course frequently happens where unexpected work i involved in a job, and usually it is taken care of by revision of the estimate. But through this system i is impossible for any estimate to involve a large overrun without the matter first coming up to the chie engineer and obtaining his approval.

To Come Out
Yr. Mo. Day

TICKLER

Mr. E. A. West:
The charges to date on W. O. No. ....................
............... are now in excess of estimated cost.
This job is still open and charges coming in. Please advise.

| | *Charges to date* | |
|---|---|---|
| | *Estimate* | *Actual* |
| Labor<br>Material | ______ | ______ |
| Total | ______ | ______ |

..............................
Chief Cost Clerk

DISPATCHING ENGINEERING DEPARTMENT WORK—FIG. 10—FOR FOR WARNING CHIEF ENGINEER OF OVER-RUN ON ANY JOB

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## Higher Fare Publicity

### New York Companies Begin to Tell Their Story t the Public in Campaign for 6-Cent Fare

In their campaign for higher fares in New Yor State, the electric railways in the Second District som time ago appointed a sub-committee on publicity of th committee on ways and means. This sub-committee, o which T. C. Cherry of Syracuse is chairman and B. E Tilton of Syracuse is secretary, decided that each company should present its own case in the way it shoul consider best. To assist in this work, however, a serie of eight advertisements was prepared. They are se three columns wide and about three-quarters of a column deep in the average newspaper. The typograph is simple and dignified, avoiding the flamboyance tha often mars advertising of this type.

The text of the first four advertisements is presente herewith. The fifth of the series is devoted to "expenses" and gives figures of the increased cost of labo and materials during the last five years with the decreased rate of income. The sixth is a talk on "taxes" and shows not only that taxes have greatly increase but that the company has to pay certain special taxe like the paving tax, from which it receives no benefit The seventh is on "prosperity," and its argument i that cities cannot be prosperous without efficient utilities, and utilities cannot be efficient without prosperity

## THE STREET CAR NICKEL WILL NO LONGER PROVIDE STREET CAR SERVICE

(Letter No. 1—What We Must Prove)

When we petitioned the Public Service Commission to change the street car fare in Syracuse from 5 cents to 6 cents, we knew perfectly well that no such increase would be allowed until the necessity for it had been proved up to the hilt.

The Public Service Commission will demand a *complete show-down* of the economic facts; and they will put—as Public Service Commissions in all states do—the burden of proof absolutely on the street railway companies.

What does that mean—the burden of proof on the companies? It means that nothing is taken for granted in their favor. They must prove everything. In order to get an increase in fares the companies must prove positively:

1. That they are not getting a fair return on the capital "honestly and prudently" invested, as the law phrases it.

2. They must prove that their financial situation is not due to temporary or sudden conditions.

3. They must prove that the management and operation of the business are honest and efficient.

4. They must prove that the increase is just and reasonable, and that no other plan of getting it is better.

The company cannot charge a higher fare in this city to make up losses elsewhere, nor do we propose any such thing.

Every fare question raised by any opponent whomsoever of the increased fare must be satisfactorily answered. The public interest, in short, is thoroughly safeguarded. Now, the companies want nothing in the world but to show the exact facts and get *a fair hearing* and a just verdict. We believe the public wants nothing else, and that both you and the Public Service Commission will give us exactly that.

We are fully aware that a rise in street car fares is not popular. We're asking it because we have to in order to get money to keep up the service which the city *must have or suffer*, and to pay our investors a return that will prevent their going into investments that pay better. That is all there is to it.

No business can be permanently run at a loss, and investors must get a fair return or they will not invest. Without this we cannot make improvements, build new lines, or even keep up the old.

We shall show that in Syrause they are not getting a fair return and have no prospect (unless fares are increased) of such a return. This is due to great increases of cost, running over years in materials, operation and taxes.

THE STREET CAR NICKEL WILL NO LONGER PROVIDE THE BEST STREET CAR SERVICE.

B. E. TILTON, General Manager
New York State Railways (Syracuse Lines).

## THE STREET CAR NICKEL WILL NO LONGER PROVIDE STREET CAR SERVICE

(Letter No. 2—On Profits)

"Why isn't a 5-cent street car fare enough in Syracuse?" you ask. A perfectly fair question, entitled to a frank answer. It's because *the street car nickel is shrinking in value.*

It will not supply the best street car service. The reasons are:

1. Expenses have gone up by leaps and bounds, but the rate of income is fixed at a nickel a ride.
2. Investors must have the prospect of a fair return or they will not invest.
3. Street railroads in Syracuse are not getting return enough to attract investors.

Now, let us ask you a fair question. If you have the chance to invest money in street car business at 5 per cent return or in numerous other businesses just as safe at 8 per cent or more, where will you invest it?

Our accounts show that the return to total investment in the street railroad business of Syracuse, on the average for the last ten years, has been under 5 per cent. While our gross income has increased the net income has not increased with it. These figures are from the official accounts prescribed by the Public Service Commission. They are on file at Albany and open to all. When the Public Service Commission takes up this matter it will refuse to allow an increased fare unless we can ourselves absolutely prove:

1. That the return to investors is not a "fair return" under the law.

2. That our management is efficient and honest.

3. That our capital is honestly and prudently invested and is entitled to a return.

We shall also have to show that we are not proposing to make this city pay for losses elsewhere. And we are not making any such proposition.

If we prove all those things, we believe every man in Syracuse is fair enough to say that we should gain our request.

The problem is not peculiar to Syracuse. It's the same all over the United States. Already 67 companies *have had fares increased* in various states, and numerous applications for increased fares are pending.

Everywhere the street railroad companies are suffering for exactly the same causes. *Investors can do better in other businesses.*

B. E. TILTON, General Manager
New York State Railways (Syracuse Lines).

## THE STREET CAR NICKEL WILL NO LONGER PROVIDE STREET CAR SERVICE

(Letter No. 3—Depreciation)

Depreciation—Many of the street car troubles of to-day trace right back to depreciation, or wearing out of cars, rails, etc. Street car companies have failed to provide adequately against it, either because they didn't understand the need or because a 5-cent fare doesn't provide enough income.

According to evidence taken in important cases before the Wisconsin and the Massachusetts Public Service Commissions, as well as the general experience of traction companies, plants depreciate (or wear out) on the average about 5 per cent a year. This depreciation must be provided for from current income. The Supreme Court of the United States, and courts generally, have held that an allowance for depreciation in making up fares or rates is not only constitutional *but a duty.*

The public service law of New York provides for it and requires that the companies provide a reserve out of their income for depreciation.

If you don't get enough out of fares to provide for the depreciation you must borrow it. But this method was denounced by the Public Service Commission in these words: "The consequences of such financing are too obvious to require restatement. An end to *such rottenness of method* when the regulating hand of the law does not interfere finally comes in a dilapidated and useless plant."

Now this is all very fine. But the street railroad companies are between the devil and the deep sea—

The Devil—They are required by law to provide from their income for depreciation.

The Deep Sea—The 5-cent fare doesn't produce enough income.

The Public Service Commission reports having the following facts and figures; in 1915 thirty-two (about half) of the traction companies in the Second District operated at a loss. (The average rate of return of the up-State companies on their total capital *has never been above* 5 *per cent* in the last five years.)

Less than half of the companies could set aside any reserve for depreciation. The amount they did set aside in the last five years fell gradually from 1.49 per cent in 1911 to 0.75 per cent in 1915. In Syracuse we set aside 3.5 per cent. It ought to be fully 5 per cent in order to protect investors in their investment and the public in its service. With a 5-cent fare this is impossible.

This makes a great deal of difference to you and every one interested in the city's prosperity. Here is why and how:

To provide for depreciation by borrowing money to replace a worn-out plant would mean that in time the stock and bonds would exceed the value of the plant. This tendency (to use the language of the Supreme Court of the United States) *"would inevitably lead to disaster,* either to stockholders or to the public or both," and as the New York Public Service Commission phrased it, "bondholders have nothing from which to collect their money, stockholders have lost all they invested, and the public is given a wretched and wholly inadequate service."

WE CANNOT POSSIBLY PROVIDE PROPERLY FOR DEPRECIATION WITHOUT MORE INCOME.

B. E. TILTON, General Manager
New York State Railways (Syracuse Lines).

## THE STREET CAR NICKEL WILL NO LONGER PROVIDE STREET CAR SERVICE

(Letter No. 4—Investment)

INVESTORS are fighting shy of street railroads. If this keeps up, the companies cannot improve service, add new lines and better types of cars, or even keep up the quality of the old.

We showed you that the companies are not able to provide for depreciation (wearing out) of plant from current income. The depreciated nickel will no longer provide funds for replacements. Borrowing more money for such a purpose lessens the security the investor has on what he has already loaned.

*It has been impossible since* 1911, *in New York State, to get more money for street railroads by the sale of stock. The chance for dividends has been too slender.*

But this is not all of it. It's getting more and more difficult to even borrow money (i. e., sell bonds). If in addition to meeting the interest on its bonds a company is paying good dividends and laying aside reserve against depreciation and for surplus, there's a good margin of safety for the bondholder. But when dividends cannot be paid the investor thinks perhaps the interest on bonds may next fail to be paid. The margin of safety is narrower.

The "margin of safety" for bonds has fallen rapidly, and it's away below normal now. The "margin of safety" is the ratio of net income (remaining after paying rentals and interest on bonds) to gross income. A normal margin of safety, as investment bankers figure it, is, say, 40 per cent. In New York street railroads it has fallen gradually each year from 41.1 per cent in 1911 to 9.1 per cent in 1915. SUCH A CONDITION INVITES DISASTER.

If the nickel fare was reasonable ten years ago, it is unreasonable now, because

1. The service rendered is greater and costs more.
2. The value of the nickel is less.

The street car nickel, in short, no longer provides the best street car service.

B. E. TILTON, General Manager
New York State Railways (Syracuse Lines).

Four of Series of Eight Talks to the Public, Used by New York State Railways, Syracuse Lines

The eighth relates to "wages elsewhere." It explains the conditions under which passengers pay a fare of less than 5 cents in Cleveland and the favorable franchise terms there under which the contract with the city guarantees a return on the capital invested in the electric railway system. This, the statement concludes, is all that the railways in New York State want, namely, a fare sufficient to pay the cost of service and a fair return on the capital used in the electric railway service.

In addition to their advertisements, practically all of the companies are using car cards and pamphlets. They all tell tersely the story of fixed nickel fare and rising costs that the nickel will no longer meet. The pamphlets are illustrated.

## Cost of Electric Freight Service Discussed at New Haven Hearing

An analysis of the cost of electric freight and express service on the lines of the Connecticut Company was a feature of a recent hearing at New Haven, when the Public Utilities Commission investigated the complaint of various shippers in New Haven, Hartford and Bridgeport that the rates established by the company May 21, 1917, are excessive. Among the representatives of the company who appeared were R. S. Baldwin, chief clerk of the purchasing department; Victor S. Curtis, general traffic agent; J. M. Hamilton, general agent; W. Earl Jones, statistician of the Connecticut Company, and L. H. Kentfield, general freight agent New Haven system. The complainants urged that the company's action in abolishing its second, third and fourth-class freight rates and placing them in class 1, with further upward changes for bulky products, etc., and also in increasing its express rates, was unreasonable. For example, the lower-class electric freight rates from New Haven to Hartford were formerly from 15 to 10 cents per 100 lb. (second to fourth class). The first-class rate is 18 cents. In general, there was a former minimum express rate charge of 15 cents, which has been increased to 25 cents with a flat rate of 50 cents per 100 lb. Various witnesses testified that as a result of the changes their bills for electric express service had increased 30 to 70 per cent.

In the examination of the complainants it was generally conceded by them that the electric express and freight service are far superior to that rendered by the steam lines in the territory. Mr. Kentfield maintained that trolley express rates should be somewhat lower than those of companies like the Adams and American but higher than steam railroad freight rates between the same points. Freight classification, in his opinion, has no place in the electric express field. The trolley line does a freight business only when it handles full car loads of trap rock or similar freight, which is a service by itself, as contrasted with the carrying of general merchandise in competition with automobile express trucks and the regular express companies. Mr. Kentfield said that the Connecticut Company's new tariff provides for double and treble first-class rates on some classes of products, surveyors' instruments, for example, being three times first-class.

Evidence regarding the increased price of materials entering into electric freight and express service was then presented by Mr. Baldwin. Supplementing these data, he presented estimates of the yearly consumption of a number of staple articles by the company.

INCREASES IN PRICES OF MATERIAL ENTERING INTO ELECTRIC EXPRESS AND FREIGHT SERVICE, CONNECTICUT COMPANY

| Equipment or Material | Spring of 1916 | 1917 | Per Cent Increase |
|---|---|---|---|
| Gears | $23.52 | $32.51 | 38 |
| Pinions | 4.18 | 6.86 | 64 |
| Rail bonds | .... | .... | 17 |
| Track spikes, per 100 lb. | 2.10 | 4.10 | 95 |
| Track bolts, per 100 lb. | 2.85 | 4.50 | 58 |
| White lead, per 100 lb. | 9.55 | 13.00 | 36 |
| Ties | 0.625 | 0.70 | 12 |
| Armature, G.E.-80 motor | 25.50 | 35.05 | 38 |
| Field coils, G.E.-1000 motor | 25.77 | 35.57 | 38 |
| Window glass | .... | .... | 43 |
| Trolley poles, 12 ft. | 1.35 | 3.00 | 122 |
| 30-ft. steel poles, per lb. | 2.25 | 3.75 | 66 |
| Journal box packing (Perfection) | 0.13 | 0.20 | 53 |
| Colored thread waste | 0.07 | 0.11 | 57 |
| Air-brake parts | .... | .... | 25 |
| Wood screws | .... | .... | 110 |
| Cement, per bbl. | 2.25 | 2.65 | 17 |
| Manila rope, per lb. | 0.14 | 0.30 | 114 |
| Linseed oil, per gal. | 0.55 | 1.30 | 136 |
| Tie rods in track | 0.35 | 0.75 | 116 |
| Rattan brooms, per doz. | 4.25 | 8.75 | 105 |
| Ink, per doz. qts. | 7.65 | 8.50 | 11 |
| Manila folders, per 100 | 8.00 | 20.00 | 150 |
| Coal at mine, per gross ton | 1.30 | 3.75 | 188 |

Mr. Curtis said that the old rates of the company failed to bring a proper return for the freight and express department. In the six months ended May 31, 1917, the earnings of the department were $177,841; the operating expenses were $119,916, and the net was $57,924. Taxes, $8,290; interest on investment, $11,720, and depreciation, $9,766, reduced the net to $28,146. The proportionate interest and depreciation on the total investment of the company less express and freight facilities and equipment came to $39,179, leaving a deficit of $11,032 for the period. The company handled 71,743 tons of merchandise in this period. The company owns forty-six express cars, costing $168,429, and nineteen express stations, representing an investment of $211,485. These ranged in cost from $500 in the case of stations at Westport and Woodmont to $52,000 at New Haven. The total value of the equipment used in the department as of July 9, 1917 (filed since the hearing), was $390,677. Mr. Curtis pointed out that through electric express it is possible for a dealer to carry a smaller stock and thus reduce his overhead charges, even when located a considerable distance from the city. The company uses the telephone in tracing goods, something unknown to steam railroad practice. The cost of cars has increased from about $4,800 to $8,200 within the year. The only difference between the company's express and freight service is that in the cities of Bridgeport, New Haven, Hartford and Waterbury a wagon pick-up and delivery is included for a rate of 50 cents per 100 lb. The witness said that the company hopes to get a 33 1/3 per cent increase in revenue from the new rates.

Mr. Hamilton testified that the wages of messengers have increased 48 per cent and of freight handlers 40 per cent within two years. The pay of clerks and agents has also risen. The company has lost 75 per cent of its short-haul business to motor trucks. About half the cars sent out from the New Haven station return empty. The witness said that canned goods and flour are troublesome classes of merchandise to handle on account of flimsy packing, losses in package lots and the ease with which damages can occur. Dressed beef is far preferable to iron castings from the handling standpoint. It was brought out that 5 per cent was allowed for depreciation and 6 per cent for interest in determining the cost of the service. Counsel for each side agreed to file briefs with the commission, and the hearing was closed.

# Tell Your Story Frankly

## Experience of Northern Ohio Traction & Light Company Shows That the Public Can Be Led to Understand Railway Problems if a Company Manifests an Honest Desire to Please

PUBLICITY has a wonderful power when focused upon specific points. The public generally likes to be led and is willing to learn. These thoughts form the basis of the new publicity work of the Northern Ohio Traction & Light Company—work which in a few months has met with a favorable public response.

### Ill-Will Confronting the New Management

A short time ago Eastern capitalists bought the property of the Northern Ohio Traction & Light Company, operating interurban lines between Akron and Cleveland, Akron and Canton, Akron and Ravenna, and the city lines of Akron, Canton and Massillon. The transaction involved a huge sum of money. But the physical property was not all that the new owners obtained in the negotiations.

When the new owners took possession of the property, they were confronted with a most unusual condition which had developed. The city of Akron had grown from 60,000 inhabitants to 140,000 in less than two years. This was due to the extension of the rubber industries. Factories had sprung up almost over night, and people had come to Akron in train loads. No public service corporation, gas, telephone, express or railway, could keep up with the procession. In the case of the Northern Ohio Traction & Light Company extensions had been called for on every hand, and increased equipment had become necessary not only in rolling stock but also in power equipment.

The new arrivals had thought that these changes should be wrought over night. When this proved impossible, they began to express their dissatisfaction. This had grown enormously as the traction company, seeking every available means to improve its service, found itself hampered by a scarcity of available material, owing to the over-demand in the market. The situation had soon become acute as far as unfavorable expressions were concerned, the humorist in the papers picking the company for the "goat" and the comedian on the stage brightening his lines with "knocks."

To a certain extent city officials in the past had attacked the railway to clear their own selves from responsibility. In some respects, however, the company was at least partly at fault. Promises made had never been fulfilled, and, even where this might have been excusable, the public had not been made to see that there were extenuating reasons.

### Deciding to Explain Matters to the Public

The new management realized the company's needs as well as did the general public. The public, however, did not understand the causes as well as did the management. Hence it belabored the company with letters and personal visitations in such number that the time which the new management desired to expend in improving the system was largely consumed in waiting upon complainants.

When, therefore, H. C. Field, an Akron newspaper man with experience in Eastern publicity work, submitted a publicity plan early in 1917, the management, realizing the need of a more direct approach to the public generally, gave immediate consideration to the feasibility of the proposition. No time was wasted in bewailing the past or in criticising the public for its lack of understanding. An unhealthful condition existed, and the only question was—is this proposed plan a good remedy?

"I will give you an answer to-morrow at 4 o'clock," said A. C. Blinn, the general manager of the company. The next day, on the dot, Mr. Blinn did as he had promised. The answer was: "Go ahead." Large orders for advertising space were immediately placed with the newspapers in the cities affected, and the company began to set forth, in simple language, its policy and aims.

### Outlining the Management's Policy

One of the first of the advertisements emphasized the fact that the policy of the company is to take the public into its confidence, and, by treating it fairly and with the utmost consideration, to obtain its hearty co-operation. The full draft of the company's platform follows:

> OUR POLICY WITH THE PUBLIC
>
> We desire at all times to take the people of Akron and vicinity into our confidence, especially on matters which involve the welfare of the street-car service and also the lighting. We are a public service corporation essentially, but even so the people of this city have a right to know just what is being done to improve the traction service.
>
> Since we are mutually interested, we feel that by treating the matters in a mutual sense we can more conscientiously ask the people for their support in our undertakings. We want the people to know at all times just where we stand.
>
> Judgment by intelligent public opinion is all that an honest public service corporation expects or desires.
>
> Sane and honest public opinion is found only where efforts have been made to give the public an intelligent understanding of the actual conditions in connection with public service.
>
> It is our desire that every transaction between this company and an individual shall be satisfactory. If, perchance, it is not, it should be brought to a definite source, the general manager.
>
> Let us co-operate to the end that all will be better satisfied and greater things may be accomplished.

A follow-up advertisement along somewhat the same line stated that the words "service satisfaction" sum up the ultimate attainment for a public service corporation. Continuing, this advertisement said:

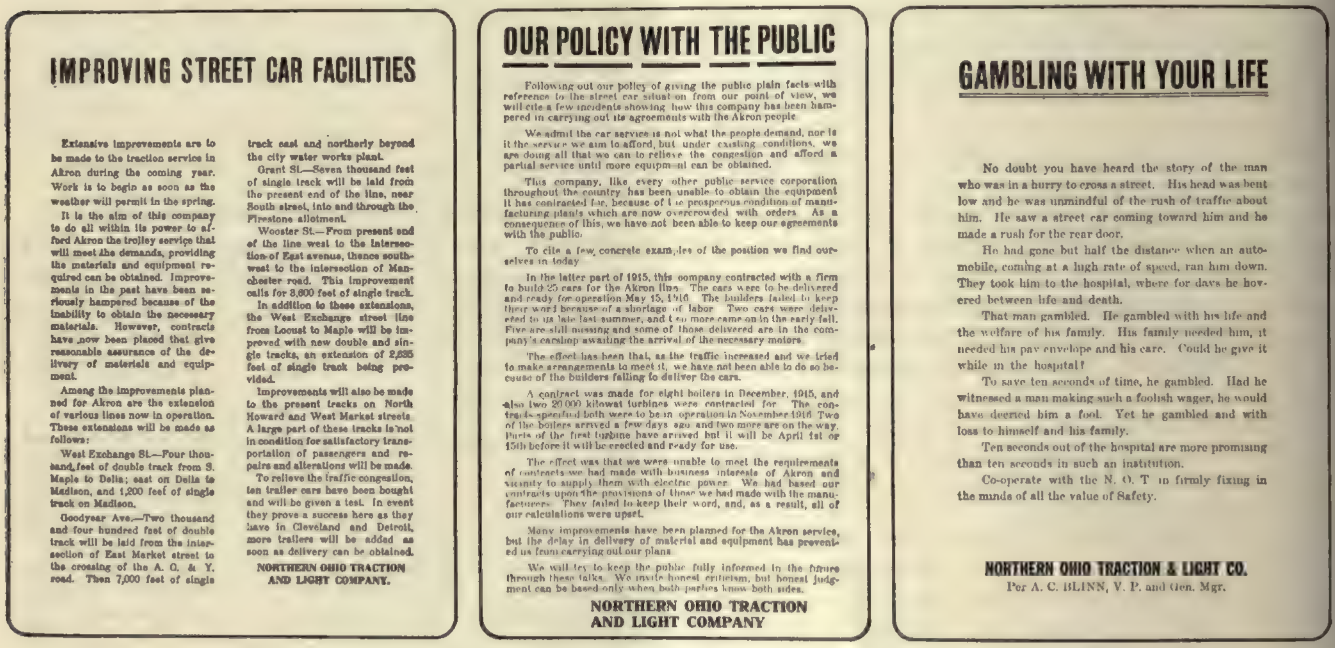
> When a utility has met the reasonable demands of the public it serves, it has accomplished its prime purpose.
>
> Thereafter its chief aims must be to maintain that service which satisfies its patrons and to extend its facilities to meet natural growth of the service demand.
>
> Service satisfaction means as much to a public utility as it does to the public served.
>
> In the history of public service corporations, satisfactory service has not been attained without co-operation.
>
> "He must be truly honest who is willing
> to be always open to inspection by honest
> men."
>
> We are willing to be "always open to inspection by honest men."

If matters don't go just as you think they should, we want to know it. With co-operation of the right kind, we can readily afford Akron the street-car service its importance demands.

Let us be fair with each other and by co-operation we can do this.

### GIVING FACTS TO THE PUBLIC

Following out its policy of giving the public facts about the street-car situation, the company, for example, cited a few incidents to show how it had been hampered in carrying out its promises to the local people. As shown by the accompanying reproduction of the advertisement in question, the company frankly admitted that the service was not what the people demanded or what the company aimed to offer, but it explained that under existing conditions it was doing all it could to relieve congestion until more equipment could be obtained. The failure of manufacturers to fill orders as promised had upset the company's calculations and prevented it from keeping its agreements with the public. Thereafter, the advertisement said, the public would be kept informed on such matters in order that it might make honest criticisms based on facts.



IMPROVING STREET CAR FACILITIES

Extensive improvements are to be made to the traction service in Akron during the coming year. Work is to begin as soon as the weather will permit in the spring.

It is the aim of this company to do all within its power to afford Akron the trolley service that will meet the demands, providing the materials and equipment required can be obtained. Improvements in the past have been seriously hampered because of the inability to obtain the necessary materials. However, contracts have now been placed that give reasonable assurance of the delivery of materials and equipment.

Among the improvements planned for Akron are the extension of various lines now in operation. These extensions will be made as follows:

West Exchange St.—Four thousand feet of double track from S. Maple to Delia; east on Delia to Madison, and 1,200 feet of single track on Madison.

Goodyear Ave.—Two thousand and four hundred feet of double track will be laid from the intersection of East Market street to the crossing of the A. C. & Y. road. Then 7,000 feet of single track east and northerly beyond the city water works plant.

Grant St.—Seven thousand feet of single track will be laid from the present end of the line, near South street, into and through the Firestone allotment.

Wooster St.—From present end of the line west to the intersection of East avenue, thence southwest to the intersection of Manchester road. This improvement calls for 3,600 feet of single track.

In addition to these extensions, the West Exchange street line from Locust to Maple will be improved with new double and single tracks, an extension of 2,635 feet of single track being provided.

Improvements will also be made to the present tracks on North Howard and West Market streets. A large part of these tracks is not in condition for satisfactory transportation of passengers and repairs and alterations will be made.

To relieve the traffic congestion, ten trailer cars have been bought and will be given a test. In event they prove a success here as they have in Cleveland and Detroit, more trailers will be added as soon as delivery can be obtained.

NORTHERN OHIO TRACTION
AND LIGHT COMPANY.

OUR POLICY WITH THE PUBLIC

Following out our policy of giving the public plain facts with reference to the street car situation from our point of view, we will cite a few incidents showing how this company has been hampered in carrying out its agreements with the Akron people.

We admit the car service is not what the people demand, nor is it the service we aim to afford, but under existing conditions, we are doing all that we can to relieve the congestion and afford a partial service until more equipment can be obtained.

This company, like every other public service corporation throughout the country has been unable to obtain the equipment it has contracted for, because of the prosperous condition of manufacturing plants which are now overcrowded with orders. As a consequence of this, we have not been able to keep our agreements with the public.

To cite a few concrete examples of the position we find ourselves in today:

In the latter part of 1915, this company contracted with a firm to build 25 cars for the Akron line. The cars were to be delivered and ready for operation May 15, 1916. The builders failed to keep their word because of a shortage of labor. Two cars were delivered to us late last summer, and two more came on in the early fall. Five are still missing and some of those delivered are in the company's carshop awaiting the arrival of the necessary motors.

The effect has been that, as the traffic increased and we tried to make arrangements to meet it, we have not been able to do so because of the builders failing to deliver the cars.

A contract was made for eight boilers in December, 1915, and also two 20,000 kilowat turbines were contracted for. The contracts specified both were to be in operation in November 1916. Two of the boilers arrived a few days ago and two more are on the way. Parts of the first turbine have arrived but it will be April 1st or 15th before it will be erected and ready for use.

The effect was that we were unable to meet the requirements of contracts we had made with business interests of Akron and vicinity to supply them with electric power. We had based our contracts upon the provisions of those we had made with the manufacturers. They failed to keep their word, and, as a result, all of our calculations were upset.

Many improvements have been planned for the Akron service, but the delay in delivery of material and equipment has prevented us from carrying out our plans.

We will try to keep the public fully informed in the future through these talks. We invite honest criticism, but honest judgment can be based only when both parties know both sides.

NORTHERN OHIO TRACTION
AND LIGHT COMPANY

GAMBLING WITH YOUR LIFE

No doubt you have heard the story of the man who was in a hurry to cross a street. His head was bent low and he was unmindful of the rush of traffic about him. He saw a street car coming toward him and he made a rush for the rear door.

He had gone but half the distance when an automobile, coming at a high rate of speed, ran him down. They took him to the hospital, where for days he hovered between life and death.

That man gambled. He gambled with his life and the welfare of his family. His family needed him, it needed his pay envelope and his care. Could he give it while in the hospital?

To save ten seconds of time, he gambled. Had he witnessed a man making such a foolish wager, he would have deemed him a fool. Yet he gambled and with loss to himself and his family.

Ten seconds out of the hospital are more promising than ten seconds in such an institution.

Co-operate with the N. O. T. in firmly fixing in the minds of all the value of Safety.

NORTHERN OHIO TRACTION & LIGHT CO.
Per A. C. BLINN, V. P. and Gen. Mgr.

SPECIMEN ADVERTISEMENTS USED BY NORTHERN OHIO TRACTION & LIGHT COMPANY

### OTHER ADVERTISEMENTS USED

Among other advertisements used by the company, some of which are shown in the accompanying illustration, was one telling in detail what the company was doing to provide for more efficient service. It was announced that work would be begun on certain extensions as soon as the spring weather permitted, and that new cars had been bought.

Another advertisement, "Going Back a Few Years," called to mind the old days when the straw on the car floor did not keep the feet warm, when horse power was used and the cost of a ride of only a few miles was 5 cents. The advertisement then showed the much greater advantages of electric railway transportation to-day, all for the same nickel.

Still another advertisement gave facts to show how the company in one year carried 69,000,000 passengers, or more than the population of fifteen of the largest states in the Union. It told of the payment of a million and a half dollars in wages to employees, the major portion of which was diverted into the commercial channels of the various municipalities throughout which the railway operates.

Occasionally an advertisement was inserted setting forth the company's policy relative to the conservation of human life and suggesting methods and means of preventing accidents. These advertisements referred especially to children who, because of crowded residential districts, were forced to play upon the highways.

### PUBLIC NOW BETTER UNDERSTANDS COMPANY PROBLEMS

Advertisements of the foregoing sorts have appeared weekly since the beginning of the year. The public has read them and has become better acquainted with conditions as they exist. Instead of censuring the company for negligence, the average citizen is now inclined to say: "The company is certainly up against it, so why kick? It'll do better at the earliest opportunity." Moreover, the average citizen has a better knowledge of what the company means to the community and is less inclined to "bite the hand that's feeding him."

Men high in municipal government have lauded the policies of the company in regard to service and its business dealings generally. Members of the Real Estate Board have expressed themselves as willing to co-operate, and the safety work of the company has been indorsed by the officials of the Automobile Club and the public press.

Only a short time ago a member of the Board of County Commissioners made this significant statement: "From the tone of the company's advertisements and from what I have learned of the management, I feel certain the company aims to give the best service possible. The men at the head of the organization are business men, say what they mean and mean what they say."

While occasionally a kick is heard, it is much more friendly in form than a few months ago. Moreover, it omes not from the men who are in control of municipal nd public affairs and the general thinking part of the ublic, but from the people of less importance.

The good results already secured have been accomlished primarily through the advertisements. An offiial car bulletin is issued by the company, but it is used n the main for publishing news items about the comany, the schedule of limited trains and general enteraining notes about the electric railway industry. Often he bulletin contains matter referring to the policy of he company, but this is used simply as a follow-up and does not as a rule go into such vital details as do the advertisements.

From its experience even thus far the company is firmly convinced that it can successfully use advertising to cultivate closer and more harmonious relations with the communities served. The public has shown itself open to enlightenment regarding utility problems; the company frankly says that service satisfaction is its yet unattained but ultimate goal. When each party thus appreciates the viewpoint of the other, better relations are no longer a dream—they are a reality.

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# Progress of New York Fare Hearings

### Of All Cases Pending in New York City, Only One Is Nearly Closed—Detailed Hearings Just Begun in Albany on Petitions of Three Companies Outside Metropolitan District

ALTHOUGH the case of one company in New York City in support of its petition for financial relief has been practically completed, the other cases before the Public Service Commission for the First District have been postponed for several weeks. Outside of the metropolitan district the Second District Commission at Albany has just begun hearings on three of thirty-one pleas for higher fares. The details of this situation are published below.

## New York City Line Closes Case

**Evidence of New York & North Shore Traction Company All Presented—Prompt Decision Anticipated**

On July 23 and 25 the Public Service Commission for the First District of New York continued hearings on the application of the New York & North Shore Traction Company, Roslyn, N. Y., for an increase in fare from 5 cents to 7 cents on its lines in Queens Borough in New York City. The company and the commission have now completed their cases, and the city has been given until Aug. 3 to present any additional evidence on its side. A decision may be rendered by the commission when it meets on Aug. 15. References to this case and to the recently granted increase in zone rates for the lines under the Second District Commission in Nassau County were made in the ELECTRIC RAILWAY JOURNAL of July 14 and 21 respectively.

### ARGUMENT ON JURISDICTION

The city, through its special counsel, E. E. Baldwin, urged a dismissal of the case before the First District Commission on the ground of a lack of power to increase the rates above the 5-cent fare maximum prescribed in the company's franchise. He urged that the question of law involved had been decided in the company's favor only by the Appellate Division and not by the Court of Appeals in New York, and that a final judicial determination should be obtained now in order to save time and money.

William L. Ransom, counsel for the commission, however, pointed out that a decision could not be obtained in less than six months and possibly not for a year. Besides, he said he had a reasonably clear personal conclusion as to what the New York courts would hold on this question, and that is that the Legislature has vested the commission with the power to increase the fare to 6 or 7 cents within the city limits if the facts are shown to require such an increase in order to permit the company to earn a fair return on its used and useful property. Moreover, he stated, the case would be compactly and expeditiously presented, and it might be a good one in which to get the legal question settled, if the city or anyone doubted the commission's power to act, should the facts show need for action.

### CITY CHARGES LACK OF FORESIGHT

The commission reserved decision on the motion of dismissal made by Mr. Baldwin. The city attorney then endeavored to show from the company's record of earnings that the railway had been improvidently built. John G. Moran, secretary and general manager of the company, testified that the builders still had faith in the enterprise, in spite of the unforeseen operating burdens that have developed since the days of construction. In reply to a hypothetical query from the commission as to what relief could be granted to a company conceived in error, Mr. Baldwin reserved his answer. He intimated later, however, that all possible means should be used before raising fares.

George W. Kuhn, valuation engineer of the commission, testified that on the basis of his table of lives (somewhat shorter in some cases than the lives set by the company) the total accrued depreciation in fixed assets up to June 30, 1917, was $577,048. The total expended for repairs and renewals was $152,426, leaving a balance of $424,622 that should be in a depreciation reserve or, if not, should be deducted from the fixed assets for rate-making purposes. The company's exhibits showed fixed assets of $1,612,008, including $1,100 of unused property.

### DISCUSSION REGARDING ZONE SYSTEM

In view of the future rapid-transit competition for a 5-cent fare in the company's territory, the commission asked whether a zone system would not be desirable in Queens Borough instead of a 7-cent fare. In a statement to the commission the company averred that the 7-cent fare would solve its financial problems, at least temporarily, and would permit the laying aside of some surplus to meet better the situation that will arise when the rapid transit lines become operative. Even if the company were to charge a 5-cent or even smaller fare, it would still lose the riders having the choice of either system. Moreover, the Long Island Railroad, through its comparatively small fares and its book trip system, already has the bulk of the riders that will use the rapid-transit system. The present trolley passengers are mostly those who are convenienced by being left at their doorsteps.

Taking up the zone question, the company stated that the paramount difficulty in such a system arises from the fact that probably 65 per cent of its riding in New York City is through riding between Flushing and Whitestone, and Flushing and Bayside. This would be likely to result under a zone plan in an equivalent of the 7-cent fare. Besides, because of the comparatively small distance the company operates within Whitestone and Bayside, the result of dividing either place by a fare point would probably mean that many passengers would walk rather than pay the extra zone fare.

The company asked, therefore, that it be permitted to charge a 7-cent fare, at least until the rapid-transit operation shows that it is cutting down the company's revenue to such an extent that it would be advisable for the company to apply for a zone system of fares. If the commission should think, however, that a zone system now would mean more revenue than a 7-cent fare, the company would suggest in general two zones—a minimum 5-cent fare with a fare point allowing the use of a 2-cent ticket beyond.

On this point the commission called J. P. H. De Windt, Jr., chief of its transit bureau, who described a copper zone system which in his opinion would substantially increase the company's revenue without involving so great a hardship on patrons as a 7-cent fare. In general his plan provided for three zones on one main line, with a minimum fare of 5 cents and 1 cent for third-zone travel, or 6 cents for a continuous trip. The other main line would, in a similar way, have four zones, with a fare of 8 cents for a continuous trip.

Counsel for the city expressed a desire to look into the zone question and complete his examination of the company along other lines. The commission stated that he might have a hearing before or on Aug. 3, in the absence of which the case would be closed on the basis of the evidence already presented.

## Transfer Charge Hearings Postponed

### Third Avenue Case Goes Over Until Sept. 10—All Cases in New York City Except One Now at Standstill

On July 23 the Public Service Commission for the First District of New York postponed until Sept. 10 the hearings upon the application of the Third Avenue Railway, New York, N. Y., for permission to charge 2 cents for transfers. The postponement was at the request of company counsel, the commission's desire for a recess in August also being considered.

This means that no further hearings will be held for about a month and a half on the question of financial relief for the street railways in New York City. As originally planned, the applications of the Third Avenue Railway, the New York Railways and the Brooklyn Rapid Transit Company for a 2-cent transfer charge were to be taken up in order by the commission. Thus far, however, only the Third Avenue Railway has begun the presentation of its case.

Other lines in New York City that have submitted petitions to the First District Commission are the New York & Queens County Railway and the Second Avenue Railroad, which asked for general relief, and the two lines on Staten Island, the Staten Island Midland Railway and the Richmond Light & Railroad Company, which requested authority to charge a 6-cent fare. The first two companies were directed to file amended petitions specifying the form of relief desired, but this step has not yet been taken. The hearings on the Staten Island cases have also been postponed until Sept. 10.

The only fare increase case in New York City that shows signs of receiving a settlement in the next few weeks is that of the New York & North Shore Traction Company. The almost complete closing of this case is described in the preceding article.

## Higher Fare Hearings in State

### First Three New York State Companies Begin Presentation of Cases Before Second District Commission

Before the Public Service Commission for the Second District of New York at Albany there was held on July 25 a hearing in the matter of the petitions of the Putnam & Westchester Traction Company, the Peekskill Lighting & Railroad Company and the Hudson River & Eastern Traction Company for authority to raise their fares within the corporate limits of the municipalities where they operate. These companies desire to increase their fares to 7 cents for one continuous trip, discontinue free transfers and issue tickets good for four trips for 25 cents.

These petitions are the first three of a group made by twenty-eight traction companies doing business within the jurisdiction of the commission. All the petitions first filed asked for a 6-cent fare, but in the cases just cited supplementary applications were made for authority to charge the higher rates noted.

Witnesses called by the petitioners testified that the railways were operating at a loss and explained the exact financial condition for the last five years. The testimony tended to show that a falling off in passenger traffic, a considerable drop in freight revenue and increased operating expenses are making it necessary that the petitioners increase their fares.

According to the petitions laid before the commission, the Putnam & Westchester Traction Company last year had a net corporate deficit of $2,974, the Peekskill company a net corporate deficit of $11,020 and the Hudson River company a net corporate deficit of $10,591.

Corporation Counsel Robert F. Barrett of Peekskill appeared in opposition to the proposed increase. He stated that the franchise given the traction company is a contract which cannot be broken. He insisted that the commission cannot change the fixed rate.

Included in the list of the twenty-eight original petitions presented to the Second District Commission was an application for an increased fare for the Empire United Railways, Inc. This petition has been revised so that separate petitions are now on file for the Empire United Railways, Inc., and each of two of its constituent lines, the Rochester, Syracuse & Eastern Railroad and the Syracuse, Lake Shore & Northern Railroad. An application for an increased fare has also been made by the Buffalo, Lockport & Rochester Railway. The total number of applications before the commission, therefore, is now thirty-one.

# Introducing Coasting Records at Houston

### A Formal Debate on Coasting and a Platform Men's Study Committee Are Among Several Notable Features

DURING October and November, 1916, 143 Rico coasting recorders were installed on cars of the Houston Electric Company and the Galveston-Houston interurban line, both of which are under Stone & Webster management. Previous to the operation of the recorders, private stop-watch tests showed that the average coasting on about 175 trips did not exceed 10.2 per cent. After all but ten Houston cars had been equipped (ten recorders having been taken away to equip the interurban cars), the following results in coasting percentages were noted:

| | |
|---|---|
| October, 1916 | 24.2 per cent |
| November, 1916 | 18.8 per cent |
| (Loss due to winter weather, temporary change due to near-side stop and carnival parades.) | |
| December, 1916 | 21.8 per cent |
| January, 1917 | 24.7 per cent |
| February, 1917 | 26.6 per cent |
| March, 1917 | 30.0 per cent |

Much higher average records can hardly be expected, as the motors used in Houston have comparatively low rates of acceleration.

Daily records are posted according to the six inspection divisions of the property. To encourage the men, a bogie is set up for each division. This bogie is easily within the attainment of any motorman. The men are, therefore, further encouraged by being urged to beat the average coasting of the division. For instance, the bogie may be set at 25 per cent, whereas the line average is 31.6 per cent.

Another unusual feature of the daily bulletins is the comments of the coasting analyst on the performances of the different men. These comments are tactful in tone with a full realization of the individual's character and naturally are intended to inspirit instead of dispirit the low coasters. The following remark is of additional interest in showing that the aid a conductor can be in coasting is fully appreciated: "Patterson used to be a good coaster when he had Cunningham for a conductor."

In referring to a case where the bogie was 35 per cent and the line average 47 per cent, the frank comment was: "We didn't think it could be done."

Here is a typical remark about a low coaster who is a tried and true veteran: "Woolery ought not to be discouraged and give up trying. Other men as old and 'sot in their ways' as he is have gone to work and made good. We believe that he is capable of doing as well as others."

### PLATFORM MEN DEBATE ON COASTING

The Houston Electric Company is by no means satisfied that it has exhausted the possibilities of the coasting recorder in raising the standard of service. It realizes, particularly, that much can be done by securing the interest and advice of its men. To this end it recently arranged a set debate on the question: "Resolved, that the use of coasting recorders is beneficial to an electric railway system." It must have been truly humorous when the committee which had been appointed to take the negative asked: "Say, you don't really want us to knock coasting, do you?" They were told to go ahead and think up every objection possible.

Naturally this debate of the platform men brought out a great many inside points that might never have come to light otherwise. For instance, one man thought coasting implied drifting to a very low speed and then jerking the controller suddenly. Another mentioned that a greater number of time points would prevent unfair jockeying of cars.

### COMMITTEE TO STUDY COASTING

As the result of this debate the company has appointed a platform men's committee consisting of anti-coasters, pro-coasters and just plain neutrals. This committee, which will receive regular pay during its studies, is to take a given line, analyze its running and traffic conditions, revise its schedules and headways upward or downward, and, in general, do all it can think of to take full advantage of coasting in the attainment of better service. This experiment in democratized management should bear good fruit in putting at the disposal of the entire organization the best knowledge of its best operators.

# Burglar-Proof Cashier's Cage

THE Washington Water Power Company has burglar-proofed one of its cashier's cages located in a carhouse in an isolated district, having been impelled to do so by an attempted hold-up which occurred some years ago.

The cage is sheathed with iron on the outer walls and the door, and the windows are provided with steel curtains, counterweighted, which can be lowered for complete protection. In the bottom of each steel curtain is a trap or hinged box which can be swung inside or outside without at any time affording a direct opening into the room. Cash is placed in the trap on the outside, which is swung in to give the cashier access to it. A small peek-hole with sliding cover is provided just above the trapdoor.

BURGLAR-PROOF CASHIER'S CAGE FOR USE IN ISOLATED CARHOUSE IN SPOKANE, WASH.

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On Jan. 1, 1913, practically all the stock of the Durham (N. C.) Traction Company was acquired by the Cities Service Company. In the last four years the sales of electric current increased 80 per cent and the number of customers served 90 per cent. Likewise, the number of revenue passengers carried in a year has increased by more than 300,000. Due to the growth of the electric business, a new turbine is on order which will more than double the present capacity of the station.

## COMMUNICATION

### The Privately Conducted Publicity Bureau

PUBLIC UTILITY PUBLICITY BUREAU
CHICAGO, July 21, 1917.

To the Editors:

We note in the issue for July 7 of the ELECTRIC RAILWAY JOURNAL a communication from Leake Carraway, director of publicity Southern Public Utilities Company, urging the establishment by the American Electric Railway Association of a publicity bureau. The writer, like Secretary Burritt of the association, believes "that the exact form which such an organization should take should be carefully considered."

The fact that established privately conducted public utility publicity bureaus or companies have been for some ten or fifteen years in the field should, we believe, receive consideration. Probably Mr. Carraway does not realize the extent of the service now being furnished to public utilities by these privately operated concerns. This bureau alone furnishes service of various kinds to more than 400 public utility companies, including gas, electric and street railway companies, and other publicity concerns and experts, we believe, do an equally large volume of business.

We are publishing a company's employees' magazine for electric railways to distribute among their men which is giving such good service at a reasonable cost that some companies have discontinued their individual publications and are using this. By inserting a few pages of original matter each month they virtually secure an individual publication at a great saving in expense. It is now possible for companies with but twenty-five or thirty employees to secure the advantages of this kind of publicity at a small outlay.

To say, as Mr. Carraway does, that efficient results cannot be obtained from these co-operative publications is like claiming that an isolated plant can give better and cheaper service than a central station, or that a city can be best served by three or four competing electric railways instead of one system.

The fundamentals of public utility operation are the same whether the utility is in San Francisco or New York. And this is true as to public utility publicity. You don't teach trainmen one kind of courtesy in Jacksonville, Fla., and another kind in Portland, Ore. There is not one brand of safety first which can be used in Denver only but would result in disaster in Newark, N. J. Inspiring your employees to loyalty and higher ideals is not a matter of location. An article of inspiration will have just as much effect if read by a conductor in Salt Lake City or a motorman in New Haven. For that matter many Canadian companies use the publicity matter which these bureaus prepare for American companies and secure gratifying results. The general movement for higher fares, too, is applicable everywhere.

Another great advantage of this co-operative publicity service is that it is furnished at so low a cost that the company is not required to seek advertising from manufacturers of supplies to help defray the high cost of individual publications. This kind of advertising is not profitable to the advertiser, but is more like a tribute exacted from the manufacturer.

Of course there are cases where the publicity is strictly local and which require strictly local treatment. In such cases, if the conditions involve labor or operating questions, special matter covering the cases is inserted in the co-operative magazines at cost. In other publicity work, dealing with rate situations or public relations to cover a special case, direct local treatment is also required. In these cases comparative statistics from other cities are of little use, and each situation must be handled on its merits. The bureaus furnish men for this work where the company has no publicity department.

The privately operated publicity bureaus and firms and individuals engaged in this work believe they are giving efficient service and would be inclined to look upon the establishment of a publicity bureau by the association which would be in direct competition with them as unfair and unwarranted.

W. F. BRASHEARS, Director.

### Pacific Claim Meeting Postponed

The convention of the Pacific Claim Agents' Association, which was scheduled to hold its annual convention last week at Portland, has decided to follow the example of the other electric railway associations and indefinitely postpone its meeting on account of the present unsettled conditions in the country. It is understood that the executive committee of the association will meet shortly to take up any matters of special importance which cannot well be postponed.

### Accident Figures from Columbus

The following announcement by the Columbus Railway, Light & Power Company tells its own story:

**Accident Prevention Record**

**Three Months Period Ending March 31, 1917.**

In the four principal classes of accidents occurring in connection with operation of street cars, our record for the first three months period of 1917 as compared with the same period of 1916 is as follows:

1. Boarding moving cars . . . . . 6% decrease.
2. Leaving moving cars . . . . . . 11% decrease.
3. Collisions—cars and wagons . . . 15% increase.
4. Collisions—cars and automobiles 86% increase.

There were 44% more automobiles in operation on the streets on March 31, 1917, than on the same date of 1916, accounting for a large part of the increase in class 4.

In *The Federalist* of Nov. 3, 1787, John Jay wrote—

> "Among the many objects to which a wise and free people find it necessary to direct their attention, that of providing for their safety seems to be the first."

That sentiment of 130 years ago holds true today as we think of the principles of liberty and public safety our nation must defend, but even amid the war-time responsibilities which Americans gladly assume and the dangers which will come to so many of us, let us not fail to give heed to and take the necessary precautions to reduce the preventable accidents and dangers of the streets.

The Columbus Railway, Power & Light Company
4-14-17

# EQUIPMENT and MAINTENANCE

HAVE YOU A GOOD WAY OF DOING A JOB?
*—Pass It Along*

*In This Issue:* S. A. Bullock Tells the Causes of Car Nosing and How to Remedy It.

## Car Nosing

### The Author Discusses Reasons for This Action of Moving Cars and Suggests Means for Limiting It

BY S. A. BULLOCK
Manager Electric Truck Department, the Baldwin Locomotive Works

Car nosing, which is horizontal oscillation of the car body about instantaneous axes, occurs on tangent track and is usually negligible on curves. In passenger service a slight amount of nosing is preferable to the rigid transverse shock of non-swinging bolsters, but when these oscillations become excessive, nosing becomes a question of serious moment.

Some of the factors to be considered are: (1) Irregularities of the track; (2) lateral play in the moving parts; (3) overhanging weights.

In general, as compared with steam roads, electric lines are more subject to car nosing, since they operate under worse track conditions. The proportion of longitudinal overhanging carbody weight is greater, and there is the further consideration of the overhung motor weights. Hence, it will be necessary to confine consideration only to the nosing of the electric motor cars.

The initial cause of nosing is poor track; that is, low joints and irregular gage, which force the wheels to slide horizontally, producing a horizontal force at the wheel. This horizontal blow is transmitted through the axle, to the brass, to the journal box, to the truck frame, to the transom, to the top of the swing links, to the bottom of the links, to the spring plank, to the bolster springs, to the truck bolster and finally to the carbody center plate and the carbody.

Lateral play in the wearing parts tends to augment the nosing by permitting the horizontal force to act through the total lateral play. This accounts for the fact that there is more nosing when the trucks are worn than when they are new. Also, the overhanging weights of the motors cause the wheels to "dig in," and this is particularly the case with outside-hung motor trucks.

Since swing links are used to transform the quick-acting, horizontal, transverse forces into slow movements of a greater mass, the question of swing link design is important. If the links are extensible—*i.e.*, with a spring within the link—the nosing is excessive. If links are too short, the nosing is sharp and abrupt. If the links are too long, the nosing is languid.

A combination of short links on one truck and long links on the other has given good results. One end of the car tends to oscillate at a quicker beat than the opposite end, and in this way the synchronism of the movement is broken up, the nosing being neutralized.

Theory and practice both prove that nosing is reduced with long distances from center to center of king pins and with heavy passenger loads.

Nosing can be minimized by the following practices:

(1) Improve track conditions by leveling the low joints, keeping normal track gage, and using proper weight of rail.

(2) Reduce lateral play in the transverse moving parts by renewal of worn pieces, and break up synchronism of the movements by variable dampening of the transverse motions in the front and rear trucks.

(3) Reduce the overhang of the carbody by lengthening the distance center to center of king pins and reduce the overhang of the motors by placing the motors inside of the wheels.

## Railway Substation on Flat Car Supplies Army Post

A new army post at American Lake, about 10 miles south of Tacoma, Wash., is served by one of the lines of the Tacoma Railway & Power Company. The increase in traffic over this line has been so great that an additional substation was required. The picture shows an emergency substation that is serving the purpose until the company decides upon the proper site and builds a permanent substation.

EMERGENCY SUBSTATION FOR SUPPLYING RAILWAY SERVICE TO ARMY POST

The emergency station is mounted on a 10-ft. by 36-ft. flat car which is shored up by short lengths of wooden timbers. The energy is transformed from 13,200-volt, three-phase, 60-cycle alternating current to 600-volt direct current. The apparatus used is all equipment which the company had on hand. It consists of two 180-kva., 13,200-2200-volt, three-phase-two-phase transformers; two 150-kva., 2200-400-volt, two-phase transformers and a 250-kw., two-phase rotary converter.

# Switch Which Prevents Failure of Signal Current

### Pennsylvania Railroad Has Developed a Switch Which Transfers Signal Feeders from One Source of Supply to Another in Less than One-Twentieth of a Second

BY H. K. LE SURE
Assistant Master Mechanic, Electrical Equipment, Pennsylvania Railroad, West Philadelphia, Pa.

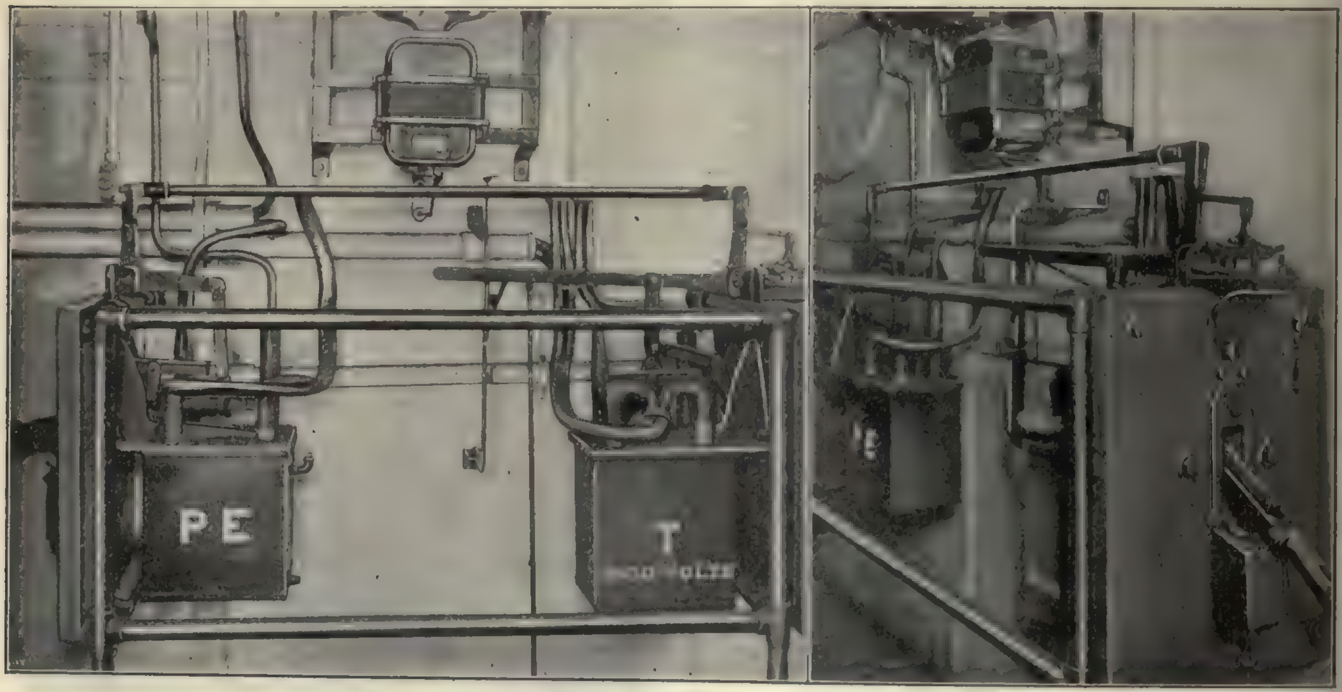
Modern a.c. signal relays are undoubtedly more sensitive to momentary power interruptions than any other piece of apparatus in commercial use. On trunk lines where a large percentage of the service is operated by steam locomotives, the failure of signal power, causing all signal semaphore arms to go to stop position, results in considerable delay to trains, and it is, therefore, important that means be provided to insure a continuous supply of signal power, thus avoiding one source of signal failures. On the Philadelphia-Paoli and Chestnut Hill electrifications of the Pennsylvania Railroad, the signal system uses 3400-volt, single-phase, 60-cycle current, the power being obtained from motor-generator sets fed from transformers connected to the 11,000-volt, three-phase, 25-cycle traction bus. An emergency source of signal power is supplied from the 2300-volt, 60-cycle lighting feeders of the Philadelphia Electric Company, and the problem was to provide a means by which the signal load could be automatically transferred from the motor-generator sets to the emergency power supply, the transfer to be made at such speed that the signal relays would not be affected.

There are on the market several electric switching devices designed to change the supply of power from one source to another in the event of interruption of either source. However, apparatus of this type is usually designed for use on low-voltage circuits and is not designed especially for high-speed operation. The present condition involved a high-voltage system and one in which the time required for the actual change of the sources of power does not exceed 3 cycles, since it has been found that an interruption of 5 or 6 cycles is great enough to cause the galvanometer or vane type of relay to drop.

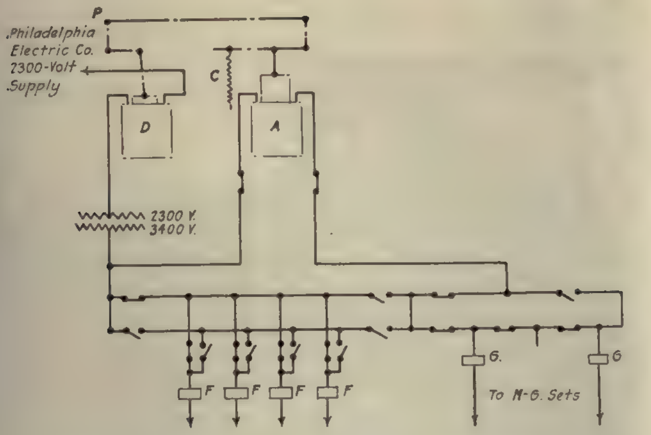
The changeover switching device developed consists of two 75-amp., 4500-volt, double-pole oil switches mounted back to back on separate panels and mechanically interlocked by means of bell cranks and connecting links, as shown in the accompanying halftones. Referring to the first wiring diagram switch *A* acts as a tie between the 3400-volt, 60-cycle motor-generator sets and the outgoing 3400-volt, 60-cycle signal feeder bus. This switch is normally closed. In case of failure of the normal power supply the trip coil located under the oil switch handle unlatches switch *A*, allowing the coil spring *C* to operate the mechanism. This opens switch *A* and closes switch *D*. The latter switch ties the 2300-volt, 60-cycle emergency feeder to the step-up transformer, the high side of which is connected to the 3400-volt signal feeder bus.

The trip coil on switch *A* is actuated as follows: Referring to the second wiring diagram *X*, *Y* and *Z* are induction-type relays. Relay *X* operates on 60-cycle current supplied from the potential transformer on the 3400-volt bus. Its contacts close whenever the bus voltage drops to 3300. Relay *Y* operates on 25-cycle current taken from the 500-volt tap of the transformer supplying the motor-generator sets and it closes whenever the voltage on the 11,000-volt traction bus falls below 9500. When the contacts of both relays are closed the trip coil on switch *A* is actuated and the changeover switch will operate.

Such a condition is the result of a gradual falling off of the voltage on the 11,000-volt bus. The contacts of relay *Y* close first, and later, as the speed of the motor-generator sets decreases, the contacts of relay *X* close, thus operating the changeover switch. The voltage on the 11,000-volt bus may drop as low as 4000, and if

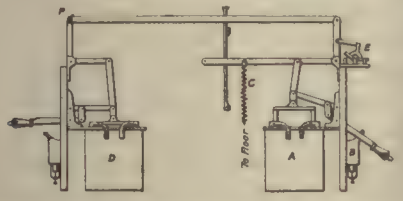


VIEWS OF CHANGEOVER SWITCHES SHOWING INTERLOCKING LEVERS



WIRING DIAGRAM OF CHANGEOVER SWITCHES AND SIGNAL FEEDERS

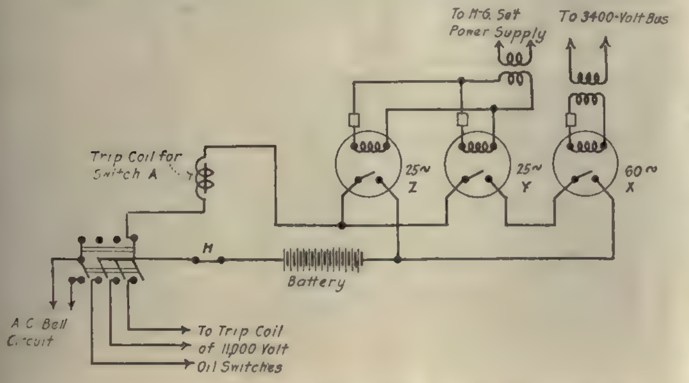
restored before the speed of the motor-generator sets changes, relay *X* will not operate. This condition prevents the changeover switch from operating at a time of momentary interruption on the traction feeder. Relay *Z* receives 25-cycle current from the same source as relay *Y*, but its contacts are not closed until the voltage on the 11,000-volt bus drops below 3500. The contacts on this relay, it will be noted, cause the changeover switch to operate through a different circuit from either of the other relays. Relay *Z*, therefore, takes care of a sudden loss of all the power on the 25-cycle traction bus. The knife switch *H* is used to prevent the operation



ARRANGEMENT OF SWITCHES AND INTERLOCKING LEVERS

of the changeover switch while relay adjustments are being made. It has been found by experience that the energy stored in the rotating parts of the motor-generator set is sufficient to carry the 150-kva. load during the short interval of time required for the operation of relays and the changeover switch.

To restore the system to normal after a 11,000-volt disturbance the motor-generator set is synchronized with the 60-cycle emergency feeder. This operation is accomplished by disconnecting the mechanical interlock between switches *A* and *D* by removing the pin *P*. Switch *G* is then opened and switch *A* closed, thus making the generator bus alive from the emergency source.



WIRING DIAGRAM OF CONTROL RELAYS FOR CHANGEOVER SWITCHES

The automatic changeover switch has operated in actual service about eighty times during the last ten months, there being only one case on record where the 60-cycle feeder was out of service at the time of changeover.

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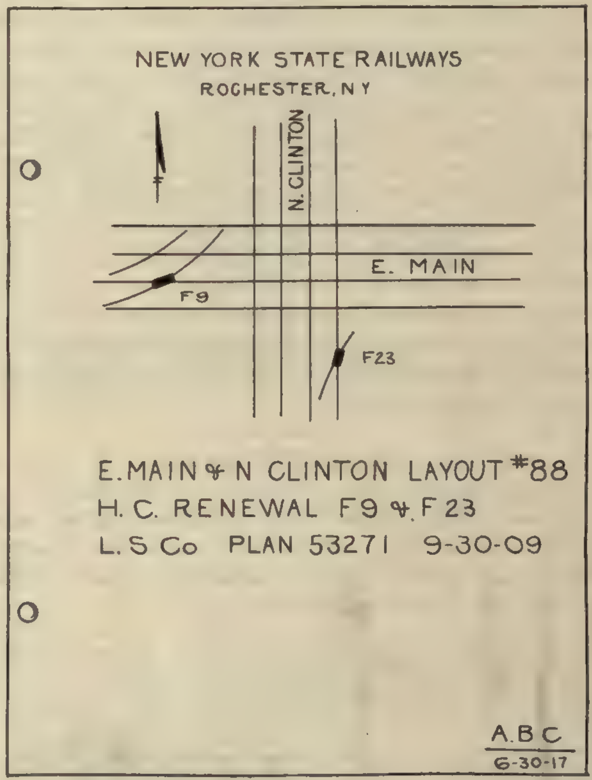
# Handling of Hard-Center Renewal Jobs Simplified

BY L. R. BROWN

Assistant Engineer Maintenance of Way, New York State Railways, Rochester, N. Y.

On a large electric railway the promptness of making hard-center renewals is an important factor in the special-work maintenance. The system in use in Rochester accomplishes this work with a minimum amount of red tape. When a broken or worn-out center is discovered by an inspector, engineer or roadmaster, it is reported to the assistant engineer, who visits the point, verifies the report and notes the exact location in the layout in his inspection book. A sketch such as the one reproduced herewith is then made, using a soft pencil and an 8-in. x 10½-in. sheet of tracing paper so that it can be blueprinted readily. The time required to look up the information as to manufacturer's plan number, piece number, etc., and prepare this rough sketch is only about five minutes.



TYPICAL SKETCH USED IN KEEPING TRACK OF HARD-CENTER RENEWALS

The sketch contains the following information: (A) Name of the railway company; (B) sketch of the layout, giving the exact location of the hard center being renewed; (C) layout number (each layout on the system is given a number corresponding to the file number of the special work plans); (D) a list of the frog numbers for which hard centers are wanted; (E) the steel company's name and the number and date of its drawing, and (F) the initials of the draftsman and date of the sketch.

Two blueprints are made from this sketch. One of these furnishes the clerk with all the information necessary for making out a requisition and is then inclosed with the order to the steel company. The second print is sent to the special-work foreman and serves to notify him that a hard center has been ordered for a certain location. When the hard centers are received from the factory the foreman knows from this sketch where they are to be placed. After the hard centers have been placed the foreman marks on the blueprint the word "Placed." He also dates it and returns it to the assistant engineer.

The original sketch, after the blueprints have been made from it, is placed in a folder marked "Hard Centers and Tongues Ordered but Not Placed." This folder thus acts as a follow-up and assures the engineer that no hard centers are lost or fail to be placed promptly at the proper locations. When the blueprint, with "placed" stamped on it, is received from the foreman the date is marked on the original and the latter is removed to another folder marked "Hard Centers and Tongues Placed, 1917." This folder gives a record of the hard centers placed during the year.

To summarize the system, the little sketch, prepared in a few minutes, provides directions to the clerk for making the requisition, full information to the manufacturer, directions to the foreman for placing, a record for following up the hard centers in stock, and a record as to what hard centers have been placed. The ordering and recording of tongue renewals is made in exactly the same manner.

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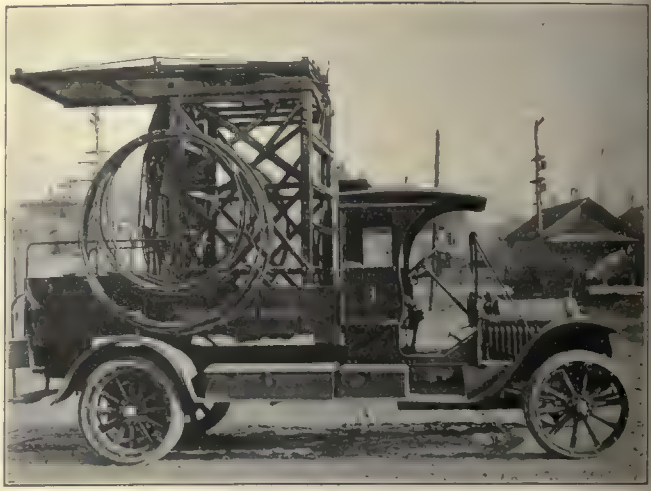
In manholes, enameled-letter tags are now being used to mark the pot-heads instead of stenciling or using aluminum tags. Stenciling is objectionable because the letters become covered with dirt and cannot be found. Aluminum tags are affected by gas and moisture so that they become illegible.



VIEW OF 2-TON MOTOR TRUCK EQUIPPED WITH A TRENTON TOWER

# Motor Truck Practice of Georgia Railway & Power Company

### Horse-Drawn Trucks Averaged 10 Miles a Day as Against an Average of 30 Miles a Day for Gasoline-Driven Cars

The Georgia Railway & Power Company, Atlanta, Ga., began the use of motor trucks for the construction and maintenance of its transmission and distribution lines about five years ago. To-day it has twenty-five motor trucks in use. Three track cars are also used for work along the right-of-way and for handling poles.

The motor trucks are divided as follows: Three ½-ton trucks, six ¾-ton trucks, two 2-ton trucks with Trenton towers, one line truck, one tower truck, four trouble cars and eight Ford cars for light duty.

The mileage per gallon of gasoline consumed is fifteen for the ¾-ton cars and ten for the heavier trucks. The motor trucks in city service average 30 miles per day as against 10 miles per day for the horse-drawn trucks formerly used. The ¾-ton trucks used in transmission

A FLEET OF MOTOR TRUCKS OF THE GEORGIA RAILWAY & POWER COMPANY WHICH HAVE REPLACED HORSE-DRAWN TRUCKS

ONE OF THE 2-TON MOTOR TRUCKS USED FOR HANDLING AND SETTING POLES

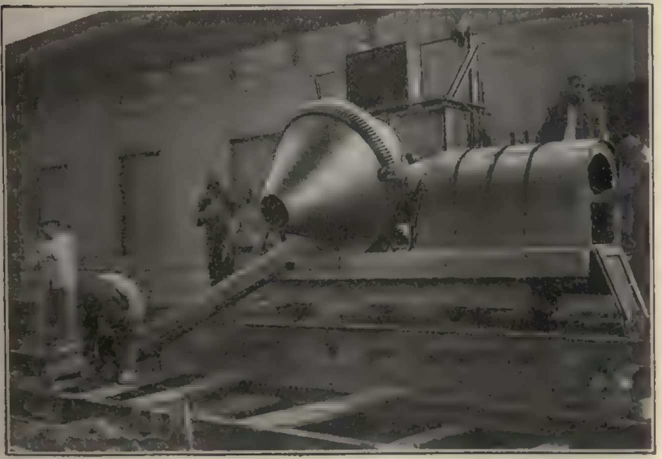
line service average 1000 miles per month. The cost of operation, including gasoline and maintenance, is 4.5 cents per mile for the Ford cars and 10 to 15 cents per mile for the heavier trucks.

## New Orleans Builds Track Under Adverse Conditions

### Old Ties Show Long Life—New Track Is Laid on Concrete Base—Street Is Paved with Wood Blocks Set in Wet Concrete

The track construction standards and methods of the New Orleans Railway & Light Company are of special interest because of the sub-surface conditions. The city is practically surrounded by water held out by levees. The soil under the city is an alluvial deposit and until a new city drainage system with large pumps was installed a few years ago, many portions of the streets of New Orleans were practically at water level. Then a 16-in. excavation would always show water. Since the new drainage system has been in operation, the permanent water level is now about 6 ft. below the street grade.

Because of the high-water level in earlier years, the wood ties used in the New Orleans track construction showed an exceptionally long life. During rehabilitation work carried on this past winter untreated cypress ties that had been under the track for more than twenty-five years, were found to be in such good condition that they still showed the check marks. M. V. Houlard, superintendent of track, credits this long life to the constant saturation of the ties. Although these ties are apparently in good condition they are not reused because of the indefiniteness of their life after having been dried.

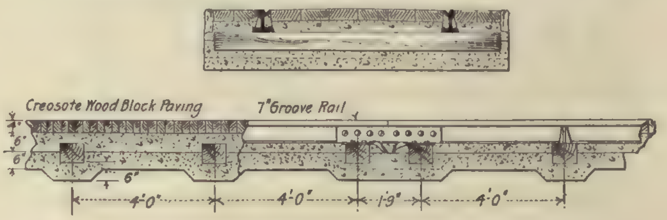


CONCRETING TRACK AT NEW ORLEANS WITH PORTABLE MIXER

### The Track and Foundation

The present track standards of the New Orleans property are of interest, as is the method used in prosecuting the work. After preliminary excavations the subgrade is prepared to a depth of 16 in. below finished paving grade and is rolled with a steam roller. The track, consisting of 105-lb., 7-in. grooved-girder, open-hearth rails, section Lorain No. 433 or Pennsylvania No. 295, is then laid on 6-in. x 8-in. x 7-ft. creosoted yellow-pine ties spaced 4 ft. between centers and provided with malleable brace tie plates. At the joints the ties are spaced approximately 21 in. between centers and the joint is supported by an Abbot plate. The rail joint consists of heavy channel plates provided with eight 1⅛-in. heat-treated bolts. Electrical bonds are welded to the rail underneath the joint plates.

After the skeleton track is laid it is aligned and surfaced by means of blocks and wedges. Then recesses are excavated under the ties to allow a minimum depth of 6 in. of concrete at any part of the base. A concrete mixture consisting of one part cement, two parts sand and five parts gravel is then poured into the excavation to within 10 in. of the top of the rail. This concrete, which leaves the mixer in a rather fluid condition, is then rammed under all the ties by means of tamping bars. After allowing a period of seven days for setting, the concrete paving base is laid to within 4 in. of the top of the rail and the spaces adjacent to the web under the head and groove are plastered with cement mortar. Creosoted pine paving blocks are paved in on the fresh mixture before setting takes place and then are thoroughly rammed to grade. The block pavement is given a flush coat of hot paving pitch, and later all small interstices are filled by running a hot iron over the tarred surface. A coat of ¼-in. fine torpedo sand is applied before the street is turned over to traffic.



STANDARD NEW ORLEANS TRACK

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The sectional three-wire system which has been in experimental use on the lines of the Springfield Street Railway on the west side of the Connecticut River for several months has proved to be satisfactory, although operating details are not yet available for publication. It is probable that the same system will be installed on the city lines when new power arrangements involving the purchase of power from the Turner's Falls Power & Electric Company are completed.

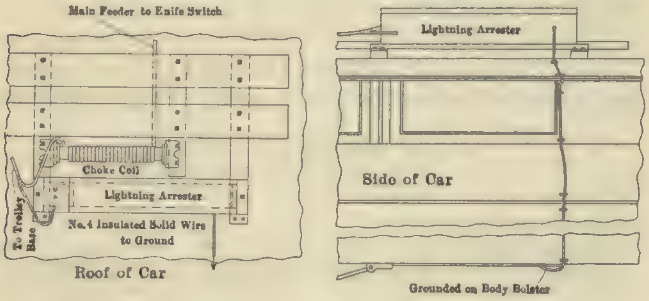
# Results Obtained in Lightning Protection of Cars

## Cars Equipped with Condenser-Type Arresters Struck Forty-three Times in One Season Without Damage

BY GEORGE JACKSON
Manager North Jersey Rapid Transit Company, Hohokus, N. J.

To protect the electrical equipment on our cars from electric storms has been a serious problem and one to which we have given much time and money in experimenting with the various protective devices as they appeared on the market. The route of our railroad passes through a section of northern New Jersey in which electric storms are particularly frequent and severe. For a distance of 15 miles the storms invariably pass in the direction of the railroad, and they go from one end to the other before they have spent their fury. Thus we are reputed to have the worst lightning belt in this section of the country.

We had adopted the recommended practice of installing an arrester along the railroad every one-fifth of a mile as well as at block signals and on each car, but as late as the summer of 1914 much trouble was experienced with each storm. Late in that year we purchased four Westinghouse condenser arresters, type K, which we saw advertised in the ELECTRIC RAILWAY JOURNAL. We also purchased two direct-current electrolytic arresters for our substation, thus having our incoming high-tension line and our outgoing feeders to cars well protected by the highly satisfactory electrolytic arresters.



METHOD OF WIRING LIGHTNING ARRESTERS, HOHOKUS, N. J.

At the time we installed our first condenser arresters it was late in the season and we had only two severe storms, but it happened in each storm that three of the cars were protected by the type K arresters and one was not. In each storm the cars not having the above protection were crippled, in one case by grounding the pump governor and in the other by grounding the compressor armature. The other cars, however, were not damaged at all, although two of them were struck in each storm. During the following winter the type K arresters were installed on all of our cars.

In the early part of the summer of 1915 we had many severe storms in which from one to four cars were struck during each storm, but in no case during the whole season were the cars damaged because of these storms. During that summer there were twenty-four storms and cars were struck forty-three times, but in each instance the arresters took care of the discharge.

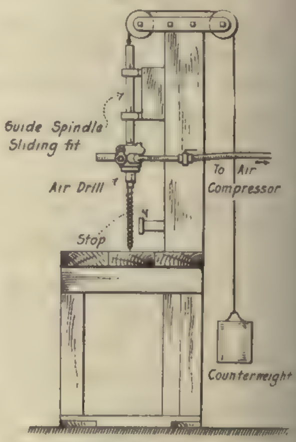
The arresters are installed on the roof of the car near one end, where the main feed wire goes to the main switch. The arrester is connected just ahead of a choke coil wound on a 3-in. spool and having about twenty turns. The ground wire is run down the outside of the car and connected to the body bolster. It is a No. 4 solid insulated wire and has no sharp bends.

During the summer we inspected the arresters each night and changed the telltale slips of paper which indicated whether or not there were any disturbances; otherwise the arresters received no attention. Since 1916 we have stopped keeping records of lightning arrester troubles as they have practically ceased.

# Wood Boring Speeded Up

BY G. B. SISSON
Mechanical Department Georgia Railway & Power Company, Atlanta, Ga.

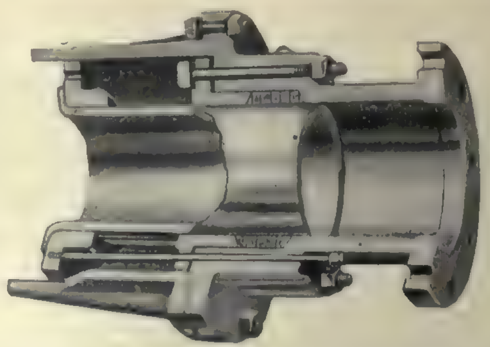
Boring holes in cross-arms and similar woodwork has been facilitated in the shops of this company by using an Independent pneumatic drill and mounting it on an improvised wood frame as shown in the sketch. Two U-shaped pieces of strap iron mounted on a wood block serve to keep the drill in a vertical position. After the drill starts on the work no hand pressure is needed, as the drill is self-feeding, and when the hole is finished the counter-weight helps to pull the heavy drill out of the work. We have found this device saves a good deal of time on jobs requiring a large amount of boring.



AIR DRILL MOUNTED FOR BORING WOOD

# Crosshead-Guided Expansion Joints

A crosshead-guided expansion joint, designed by the Ross Heater & Manufacturing Company, Buffalo, N. Y., which adapts the crosshead principle used in a steam engine, has now been in use long enough to demonstrate its effectiveness. The illustration shows the relation existing between the parts of the joint and the stuffing box, guides and crosshead. These joints have a telescope of from 4 in. to 16 in., depending on the type. In applying the joints anchorage against movement under longitudinal stress is provided at points where there are elbows or tees for branch lines, and anchorages of vertical lines are made to carry the weight of pipe and fittings.



SECTION OF CROSSHEAD-GUIDED EXPANSION JOINT

# News of Electric Railways

Traffic and Transportation
Financial and Corporate
Personal Mention
Construction News

## Seattle and Tacoma Strikes

### No Cars Run in Seattle—Partial Service in Tacoma—Conferences Looking Toward a Settlement

On the third day of the Seattle strike, which began on July 17, Judge Boyd J. Tallman, Department No. 3, Superior Court of King County, signed an alternative writ directing the Puget Sound Traction, Light & Power Company to proceed with the operation of its cars. The writ was made returnable on July 23. Acting under direction of the City Council, and with the approval of Mayor Hiram C. Gill, Corporation Counsel Hugh M. Caldwell asked in his petition that the company be compelled to operate its cars within twenty-four hours, failing in which he asked that a receiver be appointed to operate the lines and the company punished for contempt of court. The court gave the company three days in which to resume service.

In the meantime the company is only waiting adequate protection before resuming operations. A. W. Leonard, president of the company, in speaking on this point, said:

"We have been assured of protection in a general way, but in view of the deplorable situation that has been permitted to develop with reference to the express companies' strike, we may perhaps be justified in having our doubts."

Union employees of various express companies in Seattle are on strike and numerous cases of violence have been precipitated, with but little protection being afforded by the Police Department.

In speaking further on the subject of resuming service, Mr. Leonard said:

"It is possible that we will at once take up this protection matter with the city and endeavor to have it placed on a definite rather than a general basis. Having this, we will operate our cars."

Mayor Gill said:

"The traction company can have police protection if it desires to operate its cars. However, if the company imports any Connelly gunmen from Chicago or any others of that type to break the strike, I will have them arrested as fast as they arrive."

In Tacoma, where the strike had its beginning on the night of July 15, ten cars were put in operation on July 18 on the main lines. These were the first cars to move since the beginning of the strike when more than 300 employees of the Tacoma Railway & Power Company walked out. Operation of the cars was attended by no violence. The cars were manned by employees of the company who refused to strike. Aboard each car was a special officer. Further precautions were taken by placing heavy screen and steel netting over both the front and rear platforms.

A. W. Leonard, president of the Puget Sound Traction, Light & Power Company, in reciting the events which led up to the Seattle strike, made the following statement:

#### STATEMENT BY PRESIDENT LEONARD

"The strike in Tacoma was called on July 15 to force the reinstatement of seven discharged men and to secure recognition of a newly formed union.

"At that time negotiations were pending in Seattle looking to arbitration of the differences between the Puget Sound Traction, Light & Power Company and its employees on the matters of higher wages and shorter hours. When Seattle granted its traction franchise it inserted a clause providing for arbitration of such differences, on the theory that such a provision would make it impossible ever to inconvenience the public by suspension of service through a walk-out. Yet that is what happened.

"On June 21 a committee from the trainmen presented formal demands upon the company for higher wages and shorter hours. This had been preceded by the formation of a union of the Amalgamated Association and the enrollment of company men by the new union. The demands from the men, however, contained no reference to this union or to the work of organization that had been in progress.

"The committee waited on the company two days later with a request to submit the demands made on June 21 to arbitration, with the result that an agreement was reached at that time to leave the differences to mediation as provided in the terms of the franchise, and with the promise on both sides that there would be no hasty or arbitrary action. Two arbitrators were appointed immediately, James Duncan, secretary of the Central Labor Council, for the men, and C. J. Franklin, Portland, Ore., for the company.

"On July 3 an additional list of demands from employees other than trainmen was presented, and the company thereupon issued a statement making it plain that it depended upon arbitration as provided in the franchise and as agreed to in the conference of June 23.

"On July 14 a form of agreement making still greater demands was presented by the men with a suggestion that conciliation be substituted for arbitration, but promising that if this were not satisfactory the men would proceed to arbitration. The company's reply was made in these words: 'We now again make it clear that we are willing to go ahead with arbitration.'

"On the following day came the walk-out in Tacoma, and on July 16 the committee presented an ultimatum in two letters, one demanding that President Leonard personally enter the Tacoma situation on behalf of the strikers and force the reinstatement of the discharged employees there, and the other that the company recognize the union of the Amalgamated Association, with the threat of an immediate walk-out as the alternative.

"The company's cars were left in the carhouses on Tuesday. The strike was precipitated by the men refusing to abide by the agreement to arbitrate, and walking out to force the reinstatement of men previously discharged in Tacoma."

President Leonard, further reviewing the events which preceded the Seattle strike and the differences between the company and its employees, said that wages and hours were not the issue that precipitated the strike, but the refusal of the company to enter the Tacoma strike situation and the demand for recognition of the union. Said Mr. Leonard:

"The first formal demand made on behalf of the employees was based wholly on wage increases and shorter hours of service and the reinstatement of several discharged employees. It was then agreed that these demands be submitted to arbitration, as provided for in our franchise, but instead of submitting the differences which had arisen to arbitration, new demands were made upon the company, which if acceded to would have been ruinous. It was a clear case of abandoning the original issue and the agreement to arbitrate, and of forcing the situation by demanding recognition of the Amalgamated Association with a sympathetic walk-out immediately effective as the alternative.

"This union is one the company cannot recognize and continue to furnish adequate and satisfactory service. It arbitrarily demands the right to hire, discipline, direct and fire all employees under its jurisdiction and actually does that very thing to the detriment of service. Experience with it proves that the public invariably suffers wherever that organization is permitted to control street railway operation. We cannot delegate to that union, nor to any person or persons not in our employ, the right to hire, direct or make terms for us with our men."

The city of Seattle took official cognizance of the failure of the company to supply service when A. L. Valentine, superintendent of public utilities, addressed a letter to President Leonard in which he called attention to the terms of the franchise of the company fixing conditions under which service is to be rendered. In conclusion Mr. Valentine said:

"No street railway service has been given to-day, July 17, and unless I receive immediate advice that service is to be rendered as required by your franchises, I shall report to the City Council the failure of your company to operate its street railway franchises 'in accordance with their provisions or at all.'"

President Leonard, in replying to Superintendent Valentine's communication, reviewed the strike situation at length. He concluded his letter as follows:

"In short, while definite preparations were being made to arbitrate the questions of difference the trainmen, because of outside influence brought to bear upon them, broke their agreement and brought about a complete interruption of transportation, on account of something which had nothing whatever to do with the Seattle situation. We wish to advise that we are ready to resume service whenever we are guaranteed adequate protection for our property and employees. We fully realize our contractual and moral obligations, and it is our earnest desire to be placed in a position at the earliest possible moment to carry out these obligations."

Employees of the Seattle-Tacoma and Seattle-Everett interurban electric lines, operated by the Puget Sound Traction Light & Power Company, who are affiliated with the Brotherhood of Railway Trainmen, on July 18 formulated demands which were forwarded to the international officers in the East for consideration and ratification. It is believed that no trouble will occur on the interurbans, therefore, for ten days or more, unless the employees should affiliate at once with the Seattle trainmen.

A resolution adopted by the City Council of Tacoma directed the city attorney to petition the Public Service Commission to demand that action be taken directing the attorney general to apply to the court for a writ to insure the operation of the cars in Tacoma.

No cars were being operated in Seattle on July 26. Three hundred strike breakers have been imported from Chicago and New York and more are expected. It is regarded as likely that Mayor Gill may issue an order temporarily prohibiting the operation of cars on the downtown streets by strike breakers, saying it invites disorder. He insists that the outlying district also be served.

The Seattle company attempted to operate on July 20 and 21 under order of a writ by Judge Neterer in the Federal Court, who denied the injunction asked by the company to restrain the strikers from interfering with the operation of the cars. Judge Neterer declared that the situation called for executive, not judicial, action. He took under advisement the city's motion to remand to the State Court the city's case asking for a mandate to compel the operation of cars or for the appointment of a receiver. This case had been removed from the State Court on July 23.

The first conference looking toward a settlement of the strike was held on July 26 between five employees from the Tacoma Company, five from the Seattle Company and the officials of both companies. Nothing definite was agreed upon, but it was reported that progress had been made. It was believed on July 26 that the Seattle company would make no attempt to operate until a similar further conference had been held on July 27. On July 28 the strikers offered to arbitrate and return to work, providing seven discharged Tacoma men were reinstated. This was met with a counter offer from the company asking that the strikers withdraw their demand for the reinstatement of the Tacoma men. The strikers rejected this proposal.

Thirty-five cars were being operated in Tacoma on the main streets on July 26. No violence was reported there. The strikers in Tacoma are operating jitneys. No strike breakers have been used in Tacoma. Suit was brought on July 23 in the Pierce County Superior Court by the State Public Service Commission to compel the Tacoma Company to provide adequate service. The hearing was set for July 27. The Tacoma company on July 26 asked for an injunction against Messrs. Hoover and McMorrow, organizers of the Amalgamated Association. The company charged Messrs. Hoover and McMorrow with conspiracy and intimidation.

# Wage Agreement in Portland, Me.

### Summary of Working Conditions of Men on Portland Railroad and the Lewiston, Augusta & Waterville Street Railway

The Cumberland County Power & Light Company, Portland, Me., has completed negotiations with the Amalgamated Association of Street & Electric Railway Employees of America, of which its car men and shop men are members, and an agreement covering wages and other working conditions for the men has been signed for one year from May 1, 1917. Increases of 3 to 4 cents an hour are accorded platform men, while shop and other employees receive increases of 8 to 12 per cent. The new and former scales for car service are as follows:

| | Cents per Hour | |
|---|---|---|
| | Former | New |
| First year | 26 | 29 |
| Second year | 27 | 30 |
| Third year | 28 | 31 |
| Fourth year and after | 29 | 33 |

About 350 motormen and conductors and 200 miscellaneous employees are affected by the agreement. There is a provision for an automatic yearly renewal unless sixty days' notice is given prior to May 1. A standard day's work consists of nine hours, but on Saturdays, Sundays and holidays eight hours constitutes a day's service. The agreement is of the nine-hours-in-twelve type, with a guarantee of seven hours' minimum pay a day. Allowances of ten minutes are granted for making up accident reports and five minutes each for making up day cards and pulling out cars. Stools are to be provided for motormen. Extra allowances include 5 cents an hour for snow work and operating one-man cars (used in winter) and 2.5 cents for instruction service. A thirty days' probationary period is now required.

An agreement for one year has also been signed by the officers of the company with the trainmen and shopmen on the Lewiston, Augusta & Waterville Street Railway. The agreement with the men on the Lewiston, Augusta & Waterville Street Railway is practically identical with that of the Portland Railroad, with the exception that the wage scale is somewhat lower in practically every case. The pay of motormen and conductors on the Lewiston, Augusta & Waterville Street Railway, for example, is as follows:

| | Cents per Hour | |
|---|---|---|
| | Former | New |
| First year | 23 | 27 |
| Second year | 24 | 28 |
| Third year | 25 | 29 |
| Fourth year and thereafter | 26 | 31 |

Power house men, substation men, linemen and some of the shopmen are members of the local branch of the International Brotherhood of Electrical Workers, and a contract has been signed with them for one year from May 1, 1917. Briefly the agreement provides for a nine-hour day for linemen and shopmen, Mondays to Fridays inclusive, and eight hours Saturdays, Sundays and holidays with pay for nine hours. The power house and substation men work an eight-hour day. All men working seven days a week are allowed one week's vacation a year with pay. Time and a half is paid for overtime, but Sunday and holiday work is not considered overtime for seven-day men.

All of the agreements recently executed date from May 1, 1917, and the men will receive increased pay from that date.

# Public Hearings on St. Louis Bills

Alderman Tamme on July 20 introduced two ordinances into the Council of St. Louis, Mo., embodying the terms of the two plans which have been advanced for the settlement of the differences between the United Railways and the city. The measures were sent to the public utilities committee at a special meeting on July 23 and public hearings were ordered to start on the night of July 25. One measure provides for a settlement under the plan by which the city would become a partner of the company. The other provides for a settlement without any partnership arrangement. The principal provisions of both ordinances have been reviewed briefly in previous issues of this paper.

# Brooklyn Car Case Argued

### Commission Seeks to Enforce Order to Require B. R. T. to Purchase 250 Surface Cars—Company Considers Order Unreasonable

On July 18 Justice Ordway of the Supreme Court held a hearing on the writs of certiorari obtained by the Brooklyn (N. Y.) Rapid Transit Company to review the commission's order that the company increase its equipment by adding to it 250 cars for use on its surface lines.

In his argument for a dismissal of the writs Judge William L. Ransom, counsel for the Public Service Commission, declared that the voluminous correspondence on the matter clearly proved that the writs were obtained in bad faith, and that no issue was raised on which any court could set aside the order of the commission. He said that the writs were obtained without notice to the commission, and that no opportunity was given to the commission's representatives to be heard. Mr. Ransom said:

"The commission has no desire to be unjust to the company or to any of its subsidiaries. Justice and fair dealing to the company, no less than to the public, is the spirit and purpose of the Public Service Commissions law. It is difficult for the commission even now to believe that these writs represent the best judgment of the officers of the companies interested as to what should be done in dealing with the commission and the public. If anything a commission orders may be indefinitely delayed by the simple filing of a writ, without even a pretence of concealment of the corporate purpose, the public will of necessity find reason for disappointment in the failure to realize in New York the benefits won by public service regulation in States which countenance no such dilatory writs. The lower courts should refuse to grant or countenance writs of this character."

In arguing in behalf of the company, D. A. Marsh said that additional cars were not needed, and that there would be still less need for them when the new rapid transit lines were in operation. He said:

"It is unreasonable to require these companies to go into the present abnormal market and purchase cars. There has probably been no time in our nation's history when prices for labor and material were so much above normal or when deliveries were so uncertain. It should be borne in mind that the credit of the Brooklyn Rapid Transit system, of which these companies are a part, is pledged to the carrying out of rapid transit enlargement jointly with the city, entailing for our system an expenditure of not less than $60,000,000, and inasmuch as this credit must for some time be assured by the earnings of the surface lines, any unnecessary burden now imposed on those lines will be an impediment to the larger plan of transit development. The time given the companies to provide the cars is so limited that unless the dates mentioned are to be considered as subject to change, no opportunity is given to exercise a proper and reasonable discretion with respect to market conditions."

The date for filing briefs was fixed for July 24.

# Mr. Wilcox Advised Norfolk

Delos F. Wilcox, New York, N. Y., met the street railway committee of the City Council of Norfolk, Va., on July 16. As a result of the recommendations which were made by Mr. Wilcox, another meeting of the committee will be called shortly and a decision as to procedure in connection with the matter of the new railway franchise to the Virginia Railway & Power Company will be determined.

It is regarded as likely that the committee will report to the Council the need of funds to adopt the suggestions of Mr. Wilcox and ask the Council to let the committee take steps to bring the negotiations for a new franchise to a conclusion or to discharge the committee.

Mr. Wilcox advised the committee not to surrender any advantage that the city may possess. He urged that jitney regulation should wait the final determination of the franchise question. He declared also that the proposed new franchise should be written by the city. Having prepared the franchise, the committee should consider any modifications that might appear fair and just to the company, and then should put the matter squarely up to the company.

# Lincoln Service Inquiry Closed

The hearings before the State Railway Commission of Nebraska to inquire into the service furnished by the Lincoln Traction Company have been closed. The case grew out of the recent strike of the employees of the company. The company was gradually building up its service to normal with new men when complaint about alleged inadequate service was filed with the commission. In this way the old men hoped that the hand of the company would be forced and that the impression would get abroad that the company was unable to return to normal service without their help.

At one of the hearings the company introduced testimony by men who had returned to the company to show that in a very large measure the former employees were largely responsible for the inability of the company to meet service demands. Many specific acts of vandalism were reviewed. There were recitals of the all too frequent cases of dynamiting, rock throwing, greasing rails, tearing up track, and other acts of violence practised in strikes. Shocking tales were told of the contumely heaped upon the heads of some of the men who returned to the company.

G. W. Wattles, president of the Omaha & Council Bluffs Street Railway, was called as the Lincoln Traction Company's last witness. He reviewed the history of the union in that city. The Omaha union was organized in 1902 and continued up to 1909, when a strike was declared. The company won and now it employed no men who belonged to the union. Mr. Wattles said that in the beginning the Omaha company was assured by the men who promoted the union that it would make no demands for recognition and would not try to force out of the service men who did not join it. Friction soon developed. After some years, a national organizer appeared on the scene, a number of meetings were held, and about half the employees became affiliated with the union. Demands were then made that the company recognize the union and discharge those in its employ who did not belong. This the company refused to do. A strike followed. Mr. Wattles expressed the opinion that public service corporations should not be hampered by union regulations, which interfere with the obligations of a company to the public. As he viewed it, the existing laws insured the men fair treatment. Mr. Wattles expressed the opinion that the union tied a man's hands, killed initiative, and took away the stimulus to do one's best work.

# Philadelphia Bill Signed

### Governor Signs Measure Giving the City the Right of Eminent Domain

The eminent domain bill, the so-called Hecht measure, giving the city of Philadelphia, Pa., the right of eminent domain in the case of railways and franchises was signed by the Governor on July 19. Two other bills bearing on the rapid transit matters which the city desired were also passed. These bills were purely financial measures.

As noted recently in the ELECTRIC RAILWAY JOURNAL, the Salus bill, which provided for through routing between municipal railway lines and privately owned electric railways and fixed the joint rates for such lines and the terms of transferring between them, went down to defeat. Mayor Smith was much put out by the failure of the Salus bill, and charged that the combined opposition of the electric railways to the measure brought about its defeat.

One of the pieces of legislation, the Hefferman resolution, found the Mayor and A. Merritt Taylor, former director of city transit of Philadelphia, opposed over the merits of the bill. This measure was passed by the Legislature. It permits the extra 3 per cent borrowing capacity of the city now available only for transit and port development to be used for any form of permanent city improvement.

The Hecht bill authorizes any city of the first class "to acquire (existing) street railway transit facilities within such city or adjacent thereto and the franchises for operating the same by the exercise of the power of eminent domain providing for the determination by the Public Service Commission subject to appeal of the amount of compensation to be paid for the properties and franchises taken and empowering such city to operate, maintain, use, lease, license or contract for the operation so acquired."

## Strike in Kansas

### Joplin & Pittsburg Railway Forced to Suspend Service by Strike of Its Power Employees

The lines of the Joplin & Pittsburg Railway, Pittsburg, Kan, were tied up recently for four days by a strike of the power station and allied employees declared by the men as a means of forcing the company to yield to demands which had been made for increases in pay. Service on the lines of the company was suspended during the period of the strike.

The members of the engineers' and firemen's unions demanded a wage increase of $5 to $7.50 a month and a shorter working day, in fixing the new three-year working contract. The original demand of the men was for $100 a month for the engineers and $90 a month for the substation men. This scale the company refused to meet. Later the men cut the figure to $95 for engineers and $82.50 for substation men. The company offered $90 a month for the engineers and $75 a month for the substation operators. W. A. Satterlee, general manager of the company, was quoted as follows:

"We cannot afford to give the men more than we have offered. In fact, I do not see how we are going to meet the scale we have offered them unless we can get an increase in rates. We have been seeking such an increase for the past two years, but have been unable to obtain permission from the Kansas State Public Utilities Commission to make the increase. We would give the men more if we could afford it, but we cannot."

Later both sides made concessions. The compromise agreement gives the engineers $95 a month, the amount they have been demanding since they made their first concession. The company had held out for $90 a month. Substation operators who had asked for $82.50 a month accepted the company's offer of $75 a month. The scale of wages previous to the strike under the expired three-year contract was $100 a month to engineers and $75 a month to substation men, both working twelve hours a day. The firemen had previously accepted the terms of the company, but they struck after the contract was signed because the engineers did not receive their demanded increase. The eight-hour day is now made effective for all men in the two unions.

## Wages Advanced in Texas

Edward T. Moore, manager of the Dallas (Tex.) Consolidated Electric Street Railway, announced an increase in wages of all motormen and conductors of 2 cents an hour, effective on July 1.

The Houston (Tex.) Electric Company, a Stone & Webster property, has announced an increase in wages to all trainmen in its employ, including conductors and motormen, of 2 cents an hour, effective from July 1. About 500 men are affected by the increase, which is the third voluntary advance to be put into effect by the company within the last eighteen months.

An increase in wages of 2 cents an hour for all motormen and conductors has been announced by A. H. Warren, general manager of the Galveston (Tex.) Electric Company, a Stone & Webster property. The increase is effective from July 1, and is the third voluntary wage advance for the company since Jan. 1, 1916. The first raise was on Jan 1, 1916; the second on Aug. 1, 1916, and the third on July 1, 1917. The highest wage under the new scale will be 30 cents an hour, and new men will be started at 25 cents an hour. In announcing the wage increase, Mr. Warren called attention to the advancing cost of operation, but said that living cost for the men was also advancing and the company felt that it should help to lighten the burden of the employees as much as possible.

The Northern Texas Traction Company, Fort Worth, Tex., a Stone & Webster company which operates the Fort Worth street car lines, the Dallas-Fort Worth Interurban and the Oak Cliff electric railway lines in Dallas, announced, through G. H. Clifford, general manager, an increase of 10 per cent in the pay of all motormen and conductors on its lines, effective from July 1.

## Engineers Retained in Rhode Island

### Sloan, Huddle, Feustel & Freeman Employed in Rhode Island Investigation

Robert M. Feustel, president of the Fort Wayne & Northern Indiana Traction Company, and a member of the firm of Sloan, Huddle, Feustel & Freeman, Boston and Chicago, consulting engineers, has been employed by the special commission appointed by special act of the Legislature of Rhode Island to make an investigation of the Rhode Island Company. The latter operates 422 miles of electric railway in Rhode Island and has been collecting a straight 5-cent fare on all lines, but made application a short time ago to the Legislature for relief. This special commission appointed by the Legislature is composed of the chairman of the Public Service Commission, the chairman of the Tax Commission and the chairman of the Banking Commission.

Sloan, Huddle, Feustel & Freeman were employed to investigate whether there should be an increase of fare or whether changes in the operating methods of the company might bring about financial relief. They were also instructed to check the appraisal of the property of the Rhode Island Company made by Ford, Bacon & Davis for the company last fall and submitted this spring.

Inasmuch as the work of investigation is being done for the public and the company has placed itself entirely in the hands of the state officials, the case should serve as a model and should be of great interest to railway managers generally. The company has placed itself in the hands of the State, and the State, in turn, has passed on to the special commission and the engineers the question of what should be done. As stated previously in the ELECTRIC RAILWAY JOURNAL, the commission is to report to the Legislature on Feb. 18, 1918, which gives approximately eight months in which to complete the work of investigation.

## Connecting Line Must Be Built

### Boston Elevated Railway Ordered to Build Connecting Link Between Surface Lines and Subway Entrance

The Public Service Commission of Massachusetts has ordered the Boston Elevated Railway to build a double-track surface line in Pleasant Street, Boston, between Washington Street and the southerly entrance of the Tremont Street subway, in order to provide for faster service between the South Boston district and the retail shopping center of the city. Under an act of the 1917 Legislature the commission was required to investigate the necessity for such a line, including the extension of the proposed construction to the Park Square district. The company opposed the proposed expenditure on the ground that the opening of the Dorchester tunnel in the not remote future would enable passengers to travel from the foot of Broadway, South Boston, to Park Street in five minutes; that the cost of the tunnel, more than $9,000,000, would be a heavy burden, and that the company should not be required to furnish unnecessary duplicate service by a slower route after this rapid transit line has been opened. The company also contended that the Tremont Street subway was congested and that under present conditions it could not successfully digest additional traffic if the new route should prove popular.

The commission finds that by the construction of 460 ft. of double track from Washington Street to the subway entrance there will be a saving in time of about 5.5 minutes per trip in comparison with the present surface route over Broadway Extension, and from two to three minutes in comparison with the normal route, at present not used on account of the tunnel construction. The estimated cost of the extension is $38,000. The company questioned the power of the commission to require it to make this investment, but the board holds that it has authority to order the company to build the line as part of its facilities. The board does not require the company to extend the construction to the Park Square district at present, but holds that the improvement in surface line service will be useful even after the Dorchester tunnel is completed, for both regular and emergency operation.

## East St. Louis Wage Terms

The differences between the officials of the East St. Louis & Suburban Railway, East St. Louis, Ill., and the employees over the question of wages have been settled by arbitration. The board returned its findings on the afternoon of July 21. The agreement which has been reached provides that motormen and conductors on the interurban lines shall receive 33 cents an hour and the men on the city lines 31 cents an hour. The shopmen and shedmen will also get increase of approximately 15 per cent over their present wages. The new wages are retroactive to May 1. Under the old contract, which expired on April 30, interurban men were paid 28 cents an hour and city men 27 cents an hour. No distinction was made between motormen and conductors in the matter of wages.

When the old contract expired demands were made on the company by a committee of the employees calling for a new wage scale considerably above what the officials of the company were disposed to pay and one much higher than the rate finally agreed upon. Officers of the international union went to East St. Louis and made an effort to come to an agreement with the company. Sessions were held daily for several weeks, but the differences could not be reconciled. Two or three weeks ago arbitration was decided upon. The officials of the company selected Charles E. Smith, a consulting engineer of St. Louis, to represent them and the employees chose Al. L. Towers, Belleville, Ill. Many meetings were held by Messrs. Smith and Towers in the hope that the matter could be adjusted by conciliation without calling a third party. In this, however, they did not succeed. Finally Frank Kesting, former city treasurer of East St. Louis and now a contractor, was selected as the third member of the board.

## Arbitration in Buffalo

Efforts on the part of the union platform employees of the International Railway, Buffalo, N. Y., to repudiate a three-year agreement with the company and call a general strike on July 21 because of the discharge of a conductor for disobedience to the company's rules, were thwarted when Edward G. Connette, president of the company, suggested that W. D. Mahon, international president of the Amalgamated Association of Street & Electric Railway Employees, be appointed to pass upon the reasonableness of the grievances. This suggestion on the part of the company officials came as a complete surprise to the union. The offer was rejected. It was then suggested that a board of arbitration of three members be appointed. The International Railway appointed Bert L. Jones, vice-president and general manager of the Niagara Gorge Railway; the union selected John B. Kolb, a motorman, and these two arbitrators agreed upon Frank X. Schwab, a wholesale liquor dealer, as the third member of the board.

Several months ago the union made a demand upon the company for an increase in wages, in violation of a three-year agreement with the company. This agreement expires on April 30, 1918. The demand was rejected and since that time many union employees have resigned. The present trouble came to a climax about July 15 when Frank Reilly, a conductor and an officer of the union, was discharged for abandoning his car. The union demanded the man's immediate reinstatement. This the company refused. A strike vote was taken and the men decided to walk out on July 21. Arbitration was then agreed upon.

## Chattanooga Wages Adjusted

The differences between the Chattanooga Railway & Light Company, Chattanooga, Tenn., and its employees have been settled. On Oct. 7, 1916, the company made an agreement with its employees, one clause of which provided for an increase in wages within six months from the date of the agreement, provided that the earnings of the company warranted an increase.

In keeping with the spirit and letter of the agreement, and notwithstanding the earnings of the company did not warrant it, an increase of 1 cent an hour was granted to all of its railway employees, regardless of their union affiliations.

The clause in the agreement above referred to provided that in the event the company did not grant an increase in wages, the employees would have the right to demand arbitration. Complaint was made that the increase in wages was not sufficient and the employees demanded arbitration. The company maintained, however, that there was nothing to arbitrate, as the increase had been granted within the time specified in the agreement.

In order to show its good faith, and anticipating that future earnings would increase, the company voluntarily granted a further increase of 1 cent an hour to all employees of the company, effective on Aug. 1, 1917. This did not satisfy the employees and a representative of the Amalgamated Association was called to Chattanooga. Later Hywel Davies, a concilliator of the Department of Commerce and Labor of the United States, was called to Chattanooga. He arrived on July 2 and conferred with the men and officials of the company. Mr. Davies was quick to see the company had lived up to its agreement in every respect and so advised the men. At his solicitation, however, the company agreed to make the additional increase effective from July 1 instead of Aug. 1.

## Service Resumed in Lima

On July 20 the Ohio Electric Railway was operating fifteen cars on its local line at Lima with men employed to take the place of striking motormen and conductors. No cars were run after dark. Operation was resumed on July 18 with ten cars. About the same number was used the following day. The strikers did not attempt to interfere with the service, but very few persons used the cars the first few days.

On July 19 officers of the Carpenters' Union filed a petition with City Auditor D. L. Rupert asking that the city take over the street railway property by condemnation proceedings and an effort was made to prepare petitions for a referendum vote on the municipal ownership proposition. The unions affiliated with the Lima Trades & Labor Assembly will aid in this work.

The strikers have placed a number of 5-cent jitneys in operation in competition with the railway. The autos are operated on all the streets where the company is furnishing service.

**Ohio Road Wants to Abandon Unprofitable Branch.**—The Dayton, Springfield & Xenia Southern Railway, Dayton, Ohio, on July 17, filed a request with the Public Utilities Commission of Ohio for authority to abandon the Spring Valley division of its road between Spring Valley and Roslyn. It contends that the division has always lost money and that its continued operation might endanger the solvency of the company. This is the first application of the kind since the enactment of the law that stations and tracks may be abandoned only with the consent of the Public Utilities Commission.

**New Wage Agreement at Providence, R. I.**—A new wage agreement has been reached between the Rhode Island Company and the local branch of the Amalgamated Association at Providence, R. I. The agreement has a life of two years dating from June 1, 1917, and grants a wage increase ranging from 1 to 8 per cent. Uniformed men will receive the following rates per hour: First six months, 28 cents; second six months, 30 cents; second year, 31 cents; third year and over, 34 cents. Beginning June 1, 1918, men in service more than three years will receive 35 cents an hour. An increase of 4 cents an hour is granted to shopmen in the employ of the company.

**Philadelphia Awards $15,000,000 Contracts.**—W. S. Twining, Director of City Transit of Philadelphia, Pa., after a conference with Mayor Smith and Dr. William Draper Lewis on July 25 let six contracts, involving an expenditure of $14,747,359 for the construction of the main lines of the high-speed transit system. Four of the contracts were awarded to the Keystone State Construction Company, one to Smith, Hauser & MacIsaac, Inc., New York, and the sixth to the Philadelphia Subway Construction Company, a newly organized construction company. The contracts weree let upon bids which were submitted by the contractors six months ago.

**Philadelphia Appeals for Approval of Rapid Transit Construction.**—Transit Director Twining and Assistant City Solicitor Lowengrund, representing the city of Philadelphia, appeared before Chairman Ainey of the Public Service Commission on July 18 and asked the commission's approval of the city's purpose to proceed with the construction of the section of the Frankford elevated line from Arch to Callowhill Street and of the Chestnut Street subway from Front to Thirtieth Street. At the conclusion of the hearing Mr. Ainey announced that he would lay the matter before the entire commission, in executive session on July 23.

**Another New York Rapid Transit Line Opened.**—The Interborough Rapid Transit Company, New York, N. Y., began the operation of its Second Avenue elevated trains over the Queensboro Bridge on July 23 to a connection with the new rapid transit lines in the Borough of Queens, extending to Astoria on the north and to Corona on the northeast. The Queens lines in the past have been operated by trains from the Queensboro Subway, running from a connection in Manhattan with the first subway at the Grand Central Station in Forty-second Street. Under the new operation subway trains will be withdrawn from the Astoria service, and the elevated trains from the Second Avenue (Manhattan) line substituted. This will give to Queens both elevated and subway service from Manhattan and the Bronx at a single fare.

**Plan for Initiating Rapid Transit Ordinance.**—The defeat of the underground terminal and subway ordinance by the City Council of Cleveland, Ohio, has caused the friends of the movement to rally to the Mayor and plans have now been made for initiating the ordinance by petition. The petitions will probably be laid before Council on Aug. 27, the first meeting after the summer vacation, and then, if not acted upon favorably, the question will be placed before the voters at the fall election. The ordinance calls for the appointment of a street railway commission, the construction of a subway between the underground bridge approach on Superior Avenue and the Public Square and the construction of a subway terminal at the Public Square. It is proposed to issue $3,500,000 of bonds to provide funds to pay for the construction work.

**Conductors Who Stole Arraigned Before Court.**—W. G. Gilbert and Guy Brinsfield were tried at May's Landing, N. J., recently on the charge of participating in a conspiracy to mulct the Atlantic City & Shore Railroad for which they worked for a short time last summer. They were arrested in Connecticut and indicted in Atlantic County on the charge of stealing from the railroad by withholding fares. Gilbert, who is not well, was ordered by the court to return to his home and appear for sentence later. Prosecutor Charles S. Moore informed the court that the men were members of a gang that had been defrauding electric railways. They obtained jobs, it is said, by submitting fake recommendations. The apprehension of Gilbert and Brinsfield by the authorities was noted in the ELECTRIC RAILWAY JOURNAL of March 31, page 609. Previous to that Thomas Barlow, another conductor, was sentenced to serve six months in the county jail.

**Women Operators Being Considered in Los Angeles.**—Confronted with a labor shortage, the Pacific Electric Railway, Los Angeles, Cal., is considering the employment of women to operate its cars, according to a statement made by Frank Karr, chief counsel for the company, to the City Board of Public Utilities at a hearing held by the board to determine why the Pacific Electric Railway was not rendering better service. Representatives of the company admitted that a mistake had been made on July 4 when cars were taken off certain lines and some cars were not properly marked, and promised that this would not happen again. The hearing was continued to give the engineering department of the board an opportunity to make a thorough check of the service and to prepare suggestions for improving service. In response to statements made by the railroad officials that they could not secure men at the present schedule of wages, the board made it plain that it was interested only in service rendered by the company and not in wages paid.

# Financial and Corporate

## Annual Reports

### Brooklyn Rapid Transit Company

The comparative income statement of the Brooklyn (N. Y.) Rapid Transit Company for the fiscal years ended June 30, 1916 and 1917, follows:

| | 1917 | | 1916 | |
|---|---|---|---|---|
| | Amount | Per Cent | Amount | Per Cent |
| Transportation revenue... | $28,992,111 | 98.27 | $27,557,278 | 98.60 |
| Miscellaneous revenue.... | 511,908 | 1.73 | 391,493 | 1.40 |
| Total operating revenues. | $29,504,019 | 100.00 | $27,948,771 | 100.00 |
| Maintenance of way and structure .............. | $2,505,288 | 8.50 | $2,485,421 | 8.89 |
| Maintenance of equipment | 2,496,349 | 8.46 | 2,508,369 | 8.98 |
| Operation of power plant. | 2,041,617 | 6.92 | 1,725,307 | 6.18 |
| Operation of cars—trainmen's wages........... | 5,605,533 | 19.00 | 5,084,648 | 18.19 |
| Operation of cars—other expenses ............ | 1,978,089 | 6.70 | 1,858,323 | 6.65 |
| Damages ............... | 713,768 | 2.42 | 602,968 | 2.16 |
| Legal expenses in connection with damages..... | 269,523 | 0.91 | 256,113 | 0.91 |
| General law expenses.... | 57,394 | 0.20 | 66,038 | 0.24 |
| Other general expenses... | 768,991 | 2.60 | 797,652 | 2.85 |
| Freight expenses......... | 304,666 | 1.03 | 302,102 | 1.08 |
| American Railway Traffic Company—expenses ... | 199 | 0.00 | 6,961 | 0.02 |
| Total expenses......... | $16,741,417 | 56.74 | $15,693,907 | 56.15 |
| Net revenue from operation .................. | $12,762,602 | 43.26 | $12,254,864 | 43.85 |
| Income from other sources ............ | 427,814 | 1.45 | 438,705 | 1.57 |
| Gross income............ | $13,190,416 | 44.71 | $12,693,569 | 45.42 |
| Taxes ................ | $2,351,104 | 7.97 | $1,837,682 | 6.58 |
| Interest and rentals (net) | 5,644,074 | 19.13 | 5,244,055 | 18.76 |
| Total deductions..... | $7,995,178 | 27.10 | $7,081,737 | 25.34 |
| Net income.............. | $5,195,238 | 17.61 | $5,611,832 | 20.08 |

The year's surplus applicable for dividends was $5,195,238—equivalent to 6.97 per cent on Brooklyn Rapid Transit Company stock outstanding. The gross revenue from operation at $29,504,019 showed an increase of $1,555,247 or 5.5 per cent. The passenger earnings increased $1,422,626 or 5.2 per cent, $446,638 or 2.7 per cent coming from the increase in surface division earnings and $975,988 or 9.4 per cent from elevated division earnings.

The operating expenses were increased by the rising prices of labor and materials. These expenses at $16,741,417 represented an increase of $1,047,509 or 6.6 per cent. Most of this increase was caused by wages, which rose $520,884 or 10.2 per cent. The charges to maintenance of way and structures showed an increase of $19,866 or 0.80 per cent, while those for maintenance of equipment decreased $12,020 or 0.48 per cent. The aggregate amount expended, however, was less than the aggregate amount charged by $120,376, which balance was carried to the credit of reserves. The large increase of $316,309 or 18.33 per cent in power was due primarily to two factors, namely, the higher cost of coal, and the necessity for purchasing outside power because of delay on the part of the Public Service Commission in approving arrangements for the supply of power for rapid transit lines.

The burden of taxation continued to increase, the amount charged for the year being $513,421 or 27.94 per cent more than for the preceding year. Deductions from income were swelled by the addition of $442,863 to interest on account of new rapid transit properties placed in operation. Other interest and rental deductions were somewhat less than for the preceding year, making the net deductions $400,018 or 7.63 per cent greater.

The net income was $416,593 or 7.42 per cent less than for the preceding year. In other words, out of an addition of $1,555,247 in operating revenue, while $507,737 was saved in net revenue, the additional charges for taxes and interest absorbed all of this and considerably more. Nevertheless, the company was able to maintain its dividend rate of 6 per cent and add a substantial amount to the system's surplus.

The operations of the company's rapid transit lines in conjunction with those provided by the city under the provisions of the contracts of March 19, 1913, resulted for the year ending June 30, 1917, in earning not only the first preferential of $3,500,000 (which accrues under the contracts to the operator and is applicable to interest on obligations outstanding prior to the date of the contracts, and to dividends), but within $250,371 of interest at the rate of 6 per cent on the cost of new properties placed in operation since March 19, 1913. This deficit is cumulative and becomes a charge against future earnings before the city receives interest on its investment. The total deficiency from the beginning of temporary operation on Aug. 4, 1913, to June 30, 1917, is $1,037,276. These results have been attained before the completion of the combined system and without the addition of any new lines which contribute materially to net earnings. The showing justifies the confidence that it will only be a short time after complete operation when all of the operator's preferentials will have been earned and the city will get interest on its investment.

On account of the construction and equipment of rapid transit lines under contracts with the city, the allied New York Municipal Railway Corporation expended during the year an additional amount of $9,146,736, making the total expenditures to June 30, 1917, as follows: On account of contribution to city-owned lines, $11,149,308; on account of equipment of city-owned lines, $8,373,233; on account of additions, extensions and improvements of existing railroads, $30,458,769; total, $49,981,311.

The other companies of the system expended during the year for additions and improvements $1,249,326, of which $546,824 was for track and roadway (including extensions), $122,772 for electric line, $256,318 for power plant, $174,657 for cars and electrical equipment $72,581 for buildings and fixtures, $48,608 for real estate, and the remainder for miscellaneous purposes. As against these charges, however, credits were made for properties displaced aggregating in value $957,200, leaving a net addition to the property accounts of other companies $292,125. Miscellaneous operating statistics for the last two fiscal years follow:

| | | |
|---|---|---|
| Passenger earnings | $28,485,861 | $27,063,235 |
| Increase over preceding year (per cent) | 5.26 | 6.28 |
| Passengers carried | 760,519,397 | 728,465,567 |
| Revenue mileage | 98,593,632 | 98,748,451 |
| Increase or decrease over preceding year (per cent) | 0.16 | 6.28 |
| Earnings per revenue mile (cents) | 28.8 | 27.4 |
| Units per passenger (cents): | | |
| Passenger earnings | 3.74 | 3.72 |
| Miscellaneous earnings | 0.19 | 0.18 |
| Total earnings | 3.93 | 3.90 |
| Operating charges | 2.20 | 2.16 |
| Taxes | 0.31 | 0.25 |
| Interest and rentals | 0.74 | 0.72 |
| Total | 3.25 | 3.13 |
| Surplus | 0.68 | 0.77 |

### Augusta-Aiken Railway & Electric Corporation

The gross earnings of the Augusta-Aiken Railway & Electric Corporation and subsidiaries for the calendar year 1916 amounted to $838,456 as compared to $732,990 in 1915, an increase of $105,466 or 14.4 per cent. The operating expenses, including taxes, totalled $431,721 in 1916 and $381,255 in 1915, an increase of $50,466 or 13.3 per cent. The net earnings from operation, therefore, amounted to $406,734 in 1916 and $351,735 in 1915, a gain of $55,000 or 15.6 per cent. After the payment of interest charges the 1916 surplus amounted to $58,060, a large increase over the surplus of $3,137 the year before. As in 1915, no dividends were paid on the company's preferred stock. A total of $45,000 was paid in 1914 and $90,000 in 1913 and 1912.

The earnings in the electric railway department increased $42,236 or 12.5 per cent, and the expenses $43,235 or 23.3 per cent. The earnings in the electric department increased $52,557 or 15.3 per cent, and the expenses $17,648 or 16.1 per cent. The earnings from the hotel and land companies increased $10,672 or 19.9 per cent, while the expenses were less by $12,161 or 44.3 per cent. The daily receipts from railway operation averaged more than $1,000, and despite the steadily increasing number of private automobiles, are at present better than at any time in the history of the company. The operating expenses during the year were increased by the large amount expended on deferred maintenance of track, roadway and railway equipment and overhead tower lines, the cost of materials and labor for such work having greatly increased. During 1916 $79,425 was expended for additions, betterments and extensions.

## Seattle Franchise Obligation Case

### Corporation Counsel of City Seeks to Have Dismissed Railway's Appeal for Relief from Its Franchise Obligations

Hugh M. Caldwell, corporation counsel of Seattle, Wash., has petitioned the Public Service Commission to dismiss the complaint of the Puget Sound Traction, Light & Power Company, asking for relief from franchise obligations, including payment of a gross earnings tax and paving between its tracks. The petition of the company has been pending since June, 1915. In that year a motion was made by the city to dismiss the application of the company, but was lost after a hearing by the commission. Since that time no pleading has been filed nor further action taken until the completion of the valuation of the company's property heretofore begun by the commission. A decision of the Public Service Commission in the case of the city of Tacoma vs. the Tacoma Railway & Power Company, which was very similar to the Seattle case, led Mr. Caldwell to renew his motion for dismissal.

At the same time, the Public Service Commission is considering a petition of George H. Tilden, Seattle, who, with others, protests against the dismissal of the petition of the company. In his petition Mr. Tilden makes the claim that he and others are entitled to extensions to the electric railways in their vicinity and to a 5-cent fare, which the company says cannot be done if it is held to the strict terms of its franchise. He therefore requests that the commission conclude the investigation which has been started. The city of Seattle is desirous of having the matter tried in the courts. The King County Superior Court has refused to pass upon the city's suit to force the company to pave between its tracks and to pay gross earnings tax until the Public Service Commission disposes of the matter.

## Lehigh Valley Deal Arrangements

### Final Details Being Worked Out Under Which Lehigh Valley Transit Company, Lehigh Navigation Electric Company and Northern Central Company Will Be Combined

A syndicate of which Brown Brothers Company, New York, and Edward B. Smith & Company and Henry & West, Philadelphia, will be members is about ready to carry out an electric power project by which the Lehigh Valley Transit Company, Allentown, Pa., the Lehigh Navigation Electric Company and the Northern Central Company will be taken over by a new company to be called the Lehigh Power Securities Corporation. While the Lehigh Coal & Navigation Company sells its generating station and distributing system, it will own an important interest in the new corporation.

The financial plan provides for a present issue of $20,000,000 of ten-year 6 per cent secured gold notes of that corporation, and looks forward to large additional investments properly to develop the business. It is not intended to extend the present system much while construction costs are abnormally high and prompt deliveries of electric machinery almost impossible to secure, but the existing power plants will be so tied together and co-ordinated as to enable them to perform much greater and more efficient service.

The Lehigh Navigation plants at Hauto and Harwood will be enlarged to develop 70,000 kw., and then tied in with the Lehigh Valley Transit plant now being expanded to 30,000 kw. Additional plants will be constructed as required. They will be located at points where water is available.

The management of the new corporation will be in charge of the Electric Bond & Share Company, of which Sydney Z. Mitchell, New York, is president. As is well known, all the common stock of the Electric Bond & Share Company is owned by the General Electric Company.

# Electric Railway Statistics

### Data from East Show That Section Hard Hit—Expenses Continue to Mount Faster Than Revenues

A comparison of electric railway statistics for the month of April, 1917, with figures for the corresponding month of 1916, made by the information bureau of the American Electric Railway Association, indicates that the expenses of electric railways in the United States are increasing faster than the revenues. The Eastern district is suffering most in this respect.

Data for April, representing 8765 miles of line of companies scattered throughout the country, figured on the per mile of line basis, indicate an increase in operating revenues of 2.90 per cent, in operating expenses of 8.56 per cent, and a decrease in net earnings of 6.23 per cent. Data representing approximately 75 per cent of the above mileage indicate an increase in the amount of taxes paid of 5.30 per cent and a decrease in operating income of 13.29 per cent.

The returns from the city and interurban electric railway companies, as shown in detail in the accompanying table, have been classified according to the following geographical grouping: Eastern district—East of the Mississippi River and north of the Ohio River. Southern district—South of the Ohio River and east of the Mississippi River. Western district—West of the Mississippi River.

Of the three groups shown in the accompanying table, returns for the Eastern, representing 6,086 miles of line, indicate an increase in operating revenues of 2.59 per cent, in operating expenses of 9.05 per cent, and a decrease in net earnings of 7.74 per cent. Taxes paid by companies represented by approximately 70 per cent of the above mileage increased 7.14 per cent, while the operating income of these companies decreased 17 per cent.

COMPARISON OF REVENUES AND EXPENSES OF ELECTRIC RAILWAYS APRIL, 1917 AND 1916

| Account | United States | | | | Eastern District | | | | Southern District | | | | Western District | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Amount, April, 1917 | Per Mile of Line | | | Amount, April, 1917 | Per Mile of Line | | | Amount, April, 1917 | Per Mile of Line | | | Amount, April, 1917 | Per Mile of Line | | |
| | | 1917 | 1916 | % Increase | | 1917 | 1916 | % Increase | | 1917 | 1916 | % Increase | | 1917 | 1916 | % Increase |
| Operating revenues | $19,290,850 | $2,201 | $2,139 | 2.90 | $14,316,755 | $2,376 | $2,316 | 2.59 | $1,058,773 | $1,257 | $1,226 | 2.52 | $3,724,868 | $2,063 | $1,986 | 3.87 |
| Operating expenses | 12,556,543 | 1,433 | 1,320 | 8.56 | 9,361,793 | 1,554 | 1,425 | 9.05 | 620,871 | 737 | 711 | 3.65 | 2,357,075 | 1,357 | 1,257 | 7.95 |
| Net earnings | 6,734,307 | 768 | 819 | †6.23 | 4,954,962 | 822 | 891 | †7.74 | 437,902 | 520 | 515 | 0.97 | 1,367,793 | 706 | 729 | †3.16 |
| Operating ratio, per cent | 1917, 65.11; 1916, 61.71 | | | | 1917, 65.40; 1916, 61.53 | | | | 1917, 58.63; 1916, 57.99 | | | | 1917, 63.77; 1916, 63.29 | | | |
| Average number of miles of line represented | 1917, 8,765; 1916, 8,681 | | | | 1917, 6,026; 1916, 5,967 | | | | 1917, 842; 1916, 839 | | | | 1917, 1,897; 1916, 1,875 | | | |
| COMPANIES REPORTING TAXES | | | | | | | | | | | | | | | | |
| Operating revenues | $14,289,937 | $2,223 | $2,200 | 1.05 | $9,961,843 | $2,349 | $2,349 | ... | $479,598 | $1,252 | $1,228 | 1.95 | $3,667,502 | $2,133 | $2,056 | 3.74 |
| Operating expenses | 9,574,185 | 1,490 | 1,387 | 7.43 | 6,775,684 | 1,598 | 1,489 | 7.32 | 275,592 | 719 | 691 | 4.05 | 2,311,682 | 1,398 | 1,296 | 7.87 |
| Net earnings | 4,715,752 | 733 | 813 | †9.84 | 3,186,159 | 751 | 860 | †12.67 | 204,006 | 553 | 537 | †0.75 | 1,355,820 | 735 | 760 | †3.29 |
| Taxes | 1,021,557 | 159 | 151 | 5.30 | 697,834 | 165 | 154 | 7.14 | 42,557 | 111 | 105 | 5.71 | 273,192 | 156 | 153 | 1.96 |
| Operating income | 3,694,195 | 574 | 662 | †13.29 | 2,488,325 | 586 | 706 | †17.00 | 161,449 | 422 | 432 | †2.32 | 1,082,628 | 579 | 607 | †4.62 |
| Operating ratio, per cent | 1917, 67.03; 1916, 63.05 | | | | 1917, 68.03; 1916, 63.39 | | | | 1917, 57.43; 1916, 56.27 | | | | 1917, 65.54; 1916, 63.03 | | | |
| Average number of miles of line represented | 1917, 6,427; 1916, 6,347 | | | | 1917, 4,241; 1916, 4,182 | | | | 1917, 383; 1916, 383 | | | | 1917, 1,804; 1916, 1,783 | | | |

†Decrease.

Returns for the Southern and Western groups indicate that both have been affected by the rising costs of operation. The operating income of the Southern groups decreased 2.32 per cent, while that of the Western decreased 4.62 per cent. Both groups show increases in taxes paid.

The operating ratio for the country as a whole has increased from 61.71 in 1916 to 65.11 in 1917. The operating ratio of the Eastern district has increased from 61.53 in 1916 to 65.40 in 1917. The operating ratios of the Southern and Western groups have also risen.

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**American Water Works & Electric Company, New York, N. Y.**—The directors of the American Water Works & Electric Company met on July 23 and declared an initial dividend of 1¾ per cent on the cumulative first preferred stock. This action follows the general plan which was proposed to the stockholders to fund the back dividends in part by cash and in part by stock, and which was accepted. The present dividend will put the stock on a 7 per cent basis. The cumulative first preferred has been selling at 80 to 83, which will yield about 8.5 per cent at this dividend rate.

**Boston (Mass.) Elevated Railway.**—A petition has has been filed with the Massachusetts Public Service Commission by the West End Street Railway for permission to issue $458,000 of 6 per cent thirty-year bonds to reimburse the Boston Elevated Railway for additions to the property of the West End Street Railway.

**Chambersburg, Greencastle & Waynesboro Street Railway, Waynesboro, Pa.**—The directors of the Chambersburg, Greencastle & Waynesboro Street Railway, which operates a line 30 miles long from Pen-Mar to Chambersburg and an electric light and power plant in Waynesboro, are reported to have received an offer of purchase of the property from interests representing the Hagerstown & Frederick Railway, Frederick, Md.

**Philadelphia Company, Pittsburgh, Pa.**—Under the sinking fund and redemption plan for Philadelphia Company bonds there had been deposited up to the close of business on July 18, $5,563,000 of first mortgage and collateral trust bonds of a total issue of $6,500,000, and $13,630,000 of the consolidated mortgage and collateral trust bonds of a total issue of $15,148,000.

**Portsmouth, Dover & York Street Railway, Portsmouth, N. H.**—The lines of the Atlantic Shore Railway, Sanford, Me., west of the terminus of that company in York Beach, Me., have reverted to the Portsmouth, Dover & York Street Railway, one of the companies which was included in the properties that were consolidated originally to form the Atlantic Shore Railway. The Portsmouth, Dover & York Street Railway is being operated by W. G. Meloon as receiver and general manager, with R. W. Sturtevant as superintendent. Mr. Sturtevant was formerly superintendent of the western division of the Atlantic Shore Railway.

**United Railways, St. Louis, Mo.**—David R. Francis, Jr., has announced his resignation as a director of the United Railways following his appointment as a member of a committee formed to protect the interests of holders of the 4 per cent general mortgage bonds of the railway.

**Waterloo, Cedar Falls & Northern Railway, Waterloo, Ia.**—Allard, Kinnear & Company, Inc., New York, N. Y., are offering for subscription first mortgage sinking fund 5 per cent gold bonds of the Waterloo, Cedar Falls & Northern Railway of 1910, due Jan. 1, 1940. The company has outstanding $5,775,000 of first mortgage bonds, $410,000 of second mortgage bonds, $1,249,750 of preferred stock and $2,263,000 of common stock.

# Electric Railway Monthly Earnings

| Period | | Operating Revenue | Operating Expenses | Operating Income | Fixed Charges | Net Income |
|---|---|---|---|---|---|---|
| BANGOR RAILWAY & ELECTRIC COMPANY, BANGOR, ME. | | | | | | |
| 1m., May, | '17 | $65,428 | *$39,979 | $25,449 | $18,711 | $6,738 |
| 1 " " | '16 | 63,989 | *38,441 | 25,548 | 17,608 | 7,940 |
| 12 " " | '17 | 861,583 | *487,555 | 374,028 | 220,318 | 153,710 |
| 12 " " | '16 | 797,490 | *426,605 | 370,885 | 212,983 | 157,902 |
| CHATTANOOGA RAILWAY & LIGHT COMPANY, CHATTANOOGA, TENN. | | | | | | |
| 1m., May, | '17 | $117,863 | *$78,387 | $39,476 | $30,071 | $9,405 |
| 1 " " | '16 | 103,765 | *65,055 | 38,710 | 30,065 | 8,645 |
| 12 " " | '17 | 1,282,020 | *897,275 | 384,745 | 357,387 | 27,358 |
| 2 " " | '16 | 1,167,518 | *745,509 | 422,009 | 357,721 | 64,288 |
| CITIES SERVICE COMPANY, NEW YORK, N. Y. | | | | | | |
| 1m., June, | '17 | $1,388,560 | $29,785 | $1,358,775 | $233 | $1,358,542 |
| 1 " " | '16 | 740,848 | 16,520 | 724,328 | 28,858 | 695,470 |
| 2 " " | '17 | 15,865,984 | 300,303 | 15,565,681 | 13,999 | 15,551,682 |
| 12 " " | '16 | 6,459,297 | 203,841 | 6,255,456 | 491,479 | 5,763,977 |
| COLUMBUS RAILWAY, POWER & LIGHT COMPANY, COLUMBUS, OHIO. | | | | | | |
| 1m., May, | '17 | $316,274 | *$223,357 | $92,917 | $47,109 | $45,808 |
| 1 " " | '16 | 277,688 | *164,737 | 112,951 | 42,875 | 70,076 |
| 2 " " | '17 | 3,715,866 | *2,398,038 | 1,317,828 | 527,138 | 790,690 |
| 2 " " | '16 | 3,270,766 | *1,923,814 | 1,346,952 | 498,200 | 848,752 |
| OMMONWEALTH POWER, RAILWAY & LIGHT COMPANY, GRAND RAPIDS, MICH. | | | | | | |
| 1m., May, | '17 | $1,512,014 | *$931,921 | $580,093 | $437,257 | $142,836 |
| 1 " " | '16 | 1,328,071 | *707,149 | 620,922 | 420,861 | 200,061 |
| 2 " " | '17 | 17,919,035 | *10,366,987 | 7,552,048 | 5,103,594 | 2,448,454 |
| 2 " " | '16 | 15,630,910 | *8,322,835 | 7,308,075 | 4,787,941 | 2,520,134 |
| CUMBERLAND COUNTY POWER & LIGHT COMPANY, PORTLAND, ME. | | | | | | |
| 1m., May, | '17 | $236,728 | *$174,718 | $62,010 | $67,985 | $5,975 |
| 1 " " | '16 | 223,429 | *136,437 | 86,992 | 66,225 | 20,767 |
| 2 " " | '17 | 2,973,215 | *1,931,979 | 1,041,236 | 812,431 | 228,805 |
| 2 " " | '16 | 2,736,122 | *1,610,299 | 1,125,823 | 794,154 | 331,669 |
| EAST ST. LOUIS & SUBURBAN COMPANY, EAST ST. LOUIS, ILL. | | | | | | |
| 1m., May, | '17 | $301,645 | *$202,805 | $98,840 | $64,870 | $33,970 |
| 1 " " | '16 | 239,328 | *151,749 | 87,579 | 62,259 | 25,320 |
| 12 " " | '17 | 3,309,740 | *2,050,501 | 1,259,239 | 765,337 | 493,902 |
| 2 " " | '16 | 2,651,975 | *1,588,088 | 1,063,887 | 753,794 | 310,093 |
| EL PASO (TEX.) ELECTRIC COMPANY | | | | | | |
| 1m., May, | '17 | $103,174 | *$66,437 | $36,737 | $4,652 | $32,085 |
| 1 " " | '16 | 84,029 | *45,025 | 39,004 | 4,671 | 34,333 |
| 2 " " | '17 | 1,198,303 | *751,061 | 447,242 | 60,554 | 386,688 |
| 2 " " | '16 | 1,036,343 | *534,684 | 501,659 | 59,913 | 448,746 |
| GALVESTON-HOUSTON ELECTRIC COMPANY, GALVESTON, TEX. | | | | | | |
| 1m., May, | '17 | $155,988 | *$107,739 | $48,249 | $37,441 | $10,808 |
| 1 " " | '16 | 154,839 | *94,953 | 59,886 | 36,607 | 23,279 |
| 2 " " | '17 | 1,953,504 | *1,272,059 | 681,445 | 441,245 | 240,200 |
| 2 " " | '16 | 1,910,481 | *1,218,539 | 691,942 | 435,936 | 256,006 |
| GRAND RAPIDS (MICH.) RAILWAY | | | | | | |
| 1m., May, | '17 | $107,618 | *$77,355 | $30,263 | $18,174 | $12,089 |
| 1 " " | '16 | 111,126 | *72,184 | 38,942 | 14,165 | 24,777 |
| 2 " " | '17 | 1,306,964 | *865,665 | 441,299 | 205,206 | 236,093 |
| 2 " " | '16 | 1,239,177 | *831,849 | 407,328 | 167,592 | 239,736 |
| HOUGHTON COUNTY (MICH.) TRACTION COMPANY | | | | | | |
| 1m., May, | '17 | $26,466 | *$16,291 | $10,175 | $5,117 | $5,058 |
| 1 " " | '16 | 25,962 | *15,625 | 10,337 | 5,351 | 4,986 |
| 2 " " | '17 | 338,980 | *196,938 | 142,042 | 62,387 | 79,655 |
| 2 " " | '16 | 302,353 | *167,948 | 134,405 | 65,900 | 68,505 |
| JACKSONVILLE (FLA.) TRACTION COMPANY | | | | | | |
| 1m., May, | '17 | $56,762 | *$38,673 | $18,089 | 15,754 | $2,335 |
| 1 " " | '16 | 53,732 | *34,850 | 18,882 | 15,442 | 3,440 |
| 2 " " | '17 | 650,994 | *438,689 | 212,305 | 186,459 | 25,846 |
| 2 " " | '16 | 615,616 | *422,232 | 193,384 | 178,446 | 14,938 |
| LAKE SHORE ELECTRIC RAILWAY, CLEVELAND, OHIO | | | | | | |
| 1m., May, | '17 | $141,530 | *$97,997 | $43,533 | $34,253 | $9,280 |
| 1 " " | '16 | 130,172 | *85,774 | 44,398 | 36,197 | 8,201 |
| 5 " " | '17 | 659,925 | *65,053 | 194,872 | 171,837 | 23,035 |
| 5 " " | '16 | 583,317 | *397,598 | 185,719 | 181,576 | 4,143 |
| EWISTON, AUGUSTA & WATERVILLE STREET RAILWAY, LEWISTON, ME. | | | | | | |
| 1m., May, | '17 | $71,822 | *$56,988 | $14,834 | $15,636 | †$802 |
| 1 " " | '16 | 65,703 | *41,084 | 24,619 | 16,119 | 8,500 |
| 12 " " | '17 | 842,493 | *612,659 | 229,834 | 185,102 | 44,732 |
| 12 " " | '16 | 759,165 | *499,696 | 259,469 | 192,171 | 67,298 |
| NASHVILLE RAILWAY & LIGHT COMPANY, NASHVILLE, TENN. | | | | | | |
| 1m., May, | '17 | $198,301 | *$136,260 | $62,041 | $40,539 | $21,502 |
| 1 " " | '16 | 194,938 | *121,292 | 73,646 | 42,570 | 31,076 |
| 12 " " | '17 | 2,427,202 | *1,526,588 | 900,614 | 499,167 | 401,447 |
| 12 " " | '16 | 2,226,927 | *1,373,113 | 853,814 | 514,826 | 338,988 |
| NORTHERN TEXAS ELECTRIC COMPANY, FORT WORTH, TEX. | | | | | | |
| 1m., May, | '17 | $180,238 | *$109,050 | $71,188 | $29,151 | $42,037 |
| 1 " " | '16 | 150,755 | *96,489 | 54,266 | 28,692 | 25,574 |
| 12 " " | '17 | 2,058,447 | *1,212,833 | 845,614 | 348,814 | 496,800 |
| 12 " " | '16 | 1,816,978 | *1,109,697 | 707,281 | 338,578 | 368,703 |

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*Includes taxes. †Deficit.

# Traffic and Transportation

## Bay State Revenue Situation

### Brief Review of Fare Increases Recently Granted and a Summary of Present Rates for Passenger Traffic

The recent decision of the Massachusetts Public Service Commission authorizing the Bay State Street Railway, Boston, to inaugurate a six months' trial of a 6-cent fare unit on the city lines served by the company did not terminate the company's efforts to secure increased revenue, as some operating and executive readers of the ELECTRIC RAILWAY JOURNAL appear to have understood. By the commission's decision of 1916 the company was permitted to establish the 6-cent fare unit on the country lines, the rate on the city lines remaining at 5 cents with the prominent exception of Fall River, Mass., where the sale of tickets continued at the rate of six for 25 cents. Recently the commission permitted the company, after due hearings, to eliminate these tickets. On July 3, following further hearings and conferences before the board between the company and representatives of urban communities served by the road, the board allowed the company to establish the 6-cent fare unit in the urban territory with concessions in the way of tickets good in that territory only. This put the whole system for the immediate present on a 6-cent fare basis.

### NON-TRANSFERABLE FIVE-CENT TICKETS USED

This last proceeding before the commission on behalf of increased revenue led then to the establishment of a 6-cent fare unit in the cities with the sale of tickets of a decidedly restricted character. These tickets are non-transferable; they are sold in books at the rate of twenty rides for $1, and cannot be lifted without the cover. A novel feature is the invalidity of the tickets after 1 p. m. on Saturdays, Sundays and holidays, this restriction undoubtedly being placed on the ground that the bulk of the travel at these times is at least closely associated with pleasure and hence partakes in a measure of luxury. The officials of the company estimated that at the maximum about 50 per cent of the revenue in the urban territory would be derived from ticket sales, but so far this percentage has not been reached. Again, it was estimated that not over 20 per cent of the company's whole income would be derived from ticket sales. In two or three weeks more a better idea can be obtained as to the ratio of ticket sales to total and urban revenue, but it seems likely that this feature of the commission's decision will not have as much effect upon income as has been feared, particularly in quarters sympathetic to the company's aims but outside its organization.

Both tickets and transfers are good in the urban territory, but transfers are not issued in the suburban territory (in general, towns adjoining cities) except to a very limited degree, as where a suburban town is virtually identified with the urban center. The schedule has been worked out to shorten the haul per fare unit in the suburban districts, in the interest of selling transportation at a more equitable figure in relation to its total cost.

The company believes that its interurban fare schedule is in general below the level of rates yielding a return commensurate with the cost of the service. Within the next two months a revised schedule of interurban rates is to be filed with the commission, and the company will support the proposed increase both on the ground of increased and increasing costs and in the belief that high-class interurban service will appeal to the public more at a fair price than a less satisfactory service at inadequate rates.

In sum, the present main revenue from passenger traffic comes from: (1) cash fares, 6-cent unit, in urban and suburban territory; (2) cash fares, 6-cent unit, in interurban territory, essentially rural districts; (3) sale of tickets good only in urban territory and with certain restrictions.

## Jersey Road Gets Increase

### Commission Authorizes 6-Cent Fare, Making Average Mileage Rate Less Than That of Steam Road Competitor

The Board of Public Utility Commissioners of New Jersey recently granted a fare increase to the North Jersey Rapid Transit Company, Hohokus, N. J., when the financial statements of the company showed beyond question that the road had been operated on too low a basis of fares. The rate charged was 5 cents for each of the five zones, and the company proposed to increase the fare in each zone to 6 cents without changing the present zone arrangement. The average mileage rate for the different zones was formerly about 1.97 cents per mile, while the rate for the longer rides was approximately 1.7 cents per mile. On the new basis the mileage rate will be about 2.05 cents. The commission granted the 1-cent increase in view of the fact that the company's rates have been less than those charged by many of the interurban roads which in the past two years have found it necessary to increase to a 2-cent basis.

The North Jersey Rapid Transit Company is an interurban line running northward from a point in Bergen County just east of the Passaic River at Broadway, Paterson, and extends about ½ mile into New York State to Suffern. The company began operation about seven years ago and it was expected that the line would be extended to connect with one of the railroads running into Jersey City. Owing to the location of the road and the fact that it is partly paralleled by the main line of the Erie Railroad, the company has been unable to pay interest on its bonded debt and has been in the hands of receivers for several years.

Analysis of the financial statement submitted by the company showed that revenue had increased, but the cost of operation had increased in a much greater proportion. The operating deficit for the year 1916 was more than $33,000, making the total deficit at the close of the year amount to $151,546. The funded debt is $800,000, and it was shown at the hearing that the construction of the road was approximately that sum. No salaries have been paid to any administrative official other than the superintendent, and it was considered that the operation of the road has been conducted economically.

## More Revenue Asked in Seattle

The Public Service Commission of Washington has been notified by the Puget Sound Traction, Light & Power Company, Seattle, that the tariff providing for the sale of twenty-five tickets for $1 on the company's Seattle division would be canceled and that, beginning Aug. 12, only the straight 5-cent fare and the half rates for school children would be charged. A. W. Leonard, president of the company, stated that the increased costs of railway equipment make it necessary that the company take some step to increase its income. It is said that the elimination of ticket sales will increase the revenues about 5 per cent.

The city of Seattle will make an attempt to prevent the traction company from eliminating the sale of tickets, as evidenced by the fact that in answer to a communication from Corporation Counsel Hugh M. Caldwell the City Council has almost unanimously expressed itself as being willing to contest the company's proposed action. It is expected that the city's objection will shortly be filed with the Public Service Commission, with a request for a hearing.

## Connecticut Fare Controversy

### Company Is Enjoined from Discontinuing the sale of 4-Cent Tickets in Waterbury

Another fight against an increase in trolley rates has developed from the attempt on the part of the Connecticut Company to abolish the sale of twenty-five tickets for $1. The company had announced that beginning July 25 the sale of reduced-rate tickets in the city of Waterbury would be discontinued. Corporation Counsel Francis P. Guilfoyle obtained a temporary injunction from Judge Reeves in the district court to restrain the company in its proposed action, whereupon it was announced that the 4-cent ticket would be sold as usual unless the injunction was dissolve or the Public Service Commission decided in favor of th company. The Connecticut Company claims it loses $150 day through the sale of the tickets and is taking steps t have the injunction nullified.

Joseph F. Berry, counsel for the company, said he kne of no agreement with the city whereby the company obliged to sell transportation at the reduced rate. The or der did not include the cancellation of school children tickets. The company's statement was substantially in full as follows:

"With the great activity in all branches of industry an the resulting increase in prices, the cost of all material used in the extension and upkeep of the Connecticut Com pany's property, as well as all classes of wages, have s increased the cost of service that it is no longer possible t continue transportation of passengers at reduced rates The city of Waterbury has long been favored with the onl materially reduced rate for urban transportation in Con necticut. Everyone is familiar with the great increase i the cost of all materials within the past year, especiall copper and steel products. The cost of coal alone, require to produce power for the operation of cars throughout th Connecticut Company territory as a whole, has increase in the past four months $160,000 over the costs for tha period of last year.

"While the interest of any community cannot be serve by a transportation agency that is not to a reasonable ex tent a profitable enterprise, the entire transportation agenc will 'break down' if the revenues are not ample to mee current demands, and this is the situation that is rapidl overtaking the company at this time."

## Washington Jitney Decision

### Judge Neterer Grants Injunction Against Thei Operation, but Permits Them to Operate During Present Strike

On July 11 United States District Judge Neterer grante a temporary injunction to the Puget Sound Traction, Ligh & Power Company, Seattle, Wash., against E. W. Arnol and 169 other jitney operators, forbidding the operation jitneys as common carriers in Seattle. Judge Neterer hel that such operation of jitneys constitutes a nuisance and n doubt exists that the company suffers a loss of revenue account of the acts referred to in its complaint. The cou held further that the operation of "free buses" is not a thorized and that it is an invasion of the company's right The steps leading up to the application by the company fo this injunction were related in the ELECTRIC RAILWAY JOU NAL for July 21, page 123.

While refusing to modify his order of July 11 barrin the operation of jitneys on the streets over which the Puge Sound Traction, Light & Power Company holds franchise Judge Neterer on July 18 allowed the operation of moto vehicles during the time the franchise is not being used b the company due to the present strike. He refused to ente an order modifying the temporary injunction, but state that operation of motor vehicles would not be taken as violation in the spirit of the injunction during the time tha the electric railway cars are not operating. Judge Netere stated that the people of Seattle, while not directly involve in the case, present the most important issue in it and on which must be given consideration.

The motion to permit the jitneys to resume operatio during the electric railway strike was brought by W. Crawford, attorney for the jitney drivers. Attorney A. Falknor, for the company, presented to the court an affidavi signed by Vice-President William H. McGrath, deposin that W. R. Crawford has for more than six months mad active efforts to bring about a strike of the car men. M Crawford said he stood ready to deny this allegation unde oath.

More than 200 jitneys are operating in the city, on prac tically all of the routes of the railway lines. The jitne men's association has gone on record with a resolution to ex pel from the organization any driver who attempts to charg extortionate prices.

## Skip-Stop Successful in Buffalo

After operating on the skip-stop plan for two weeks on two of the busiest lines of the International Railway, Buffalo, N. Y., the municipal traffic commission is so favorably impressed with the results that plans are now being made for extending the skip-stop to other lines. The running time of cars operating upon the two streets where the plan is in effect has been materially reduced and the public has sent many letters of appreciation to the company officials and to the traffic commission. Patrons of other lines have asked that the skip stop be extended to practically every line in the city.

The introduction of skip-stop operation on the Main Street and Elmwood Avenue lines was reviewed on page 79 of the ELECTRIC RAILWAY JOURNAL for July 14. It was decided to give the new form of service a thirty-day trial on these two lines. John O. Weigel, general superintendent of traffic of the International Railway, states that the first two weeks of the trial period leaves no doubt as to the plan's success. The service will be extended to other lines as soon as practicable, according to Thomas Penney, vice-president and general counsel of the company. Mr. Penney has also recommended the establishment of additional safety zones in Main Street through the congested retail business district.

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**Trailers to Care for Heavy Traffic.**—In response to a request by Councilman W. T. Edwards, the Jacksonville (Fla.) Traction Company has agreed to run trailers on its Phoenix Park line on Saturdays to give better service during the increased traffic to the manufacturing section of the city.

**Boys Fined for Stealing Rides.**—Sixty-six boys, charged with stealing rides on the cars of the Boston (Mass.) Elevated Railway, were fined $2 each in the Juvenile Court at Boston on July 20. The boys were arrested as the result of a crusade waged by the company against miscreants who have been in the habit of stealing under the turnstiles at the South Station. Extra guards were used to assist in the round-up.

**Motor Bus Auxiliary.**—The Tacoma Railway & Power Company Tacoma, Wash., has instituted a motor bus service on a half-hourly schedule connecting the end of its Sixth Avenue line with its Point Defiance line. This will open up a large territory which at present is handicapped by lack of transportation facilities and is not sufficiently settled to make the operation of an electric railway a profitable undertaking as yet.

**Decision Against Atlantic City Jitneys.**—The Supreme Court of New Jersey has denied the writ of mandamus asked by the Atlantic City Jitney Association to compel the City Commissioners to hold a referendum election on the municipal legislation, which ruled jitneys from Atlantic Avenue. It held that there were some facts in dispute before the court and that it would be better if they were sent before a jury in the Circuit Court to establish their status.

**Jitney Bonds Required in Portland.**—By a decision of Commissioner of Public Utilities John M. Mann, of Portland, Ore., all jitneys and "for hire" cars operating in that city were required to file a bond of $2,500 by July 20. The premium charged by the only bonding company willing to issue bonds is said to be prohibitive. The jitney operators are planning to resist the enforcement of the bond ordinance. A fund is being raised for the purpose of employing an attorney.

**Increase in Fare Refused.**—The Public Service Commission of Pennsylvania recently ordered the Shamokin & Mt. Carmel Transit Company, Mt. Carmel, Pa., to continue with the old rate of fare following an attempt by the company to withdraw the issuance of strip tickets sold at the rate of six for 25 cents and to increase its fare on certain lines. The miners and others of Shamokin and Mt. Carmel opposed the action and after a hearing before the commission the old rate was restored.

**Abolition of Tickets Suspended.**—The Public Utility Commission of New Jersey has issued an order prohibiting the Bridgeton & Millville Traction Company from abolishing its six-for-a-quarter tickets and those sold at the rate of fifty for $2 until after the hearing which is to be held at Camden on Sept. 13. The company in filing its proposed schedule desired to make it effective Aug. 6. As the figures will increase the income of the road, however, the Board ruled that no alteration may be made before Nov. 6, unless the result of the hearing previous to that date, justifies it.

**New Schedule Proposed for Pacific Electric Railway.**—Officials of the Pacific Electric have been ordered to appear before the Board of Public Utilities of Los Angeles, Cal., and show cause why the company should not increase its service inside the city, which, the utilities board claims, is inadequate. It was announced that the railway must provide additional cars and more frequent service and that to assist in relieving congestion the utilities board is ready to take up the questions of re-routing cars.

**Massachusetts Road Will Ask Increase.**—The Northern Massachusetts Street Railway, Athol, Mass., will petition the Massachusetts Public Service Commission for authority to revise its fare schedule, according to an announcement made recently by Daniel P. Abercrombie, vice-president and general manager of the company. The new schedule will call for a minimum rate of 5 cents for the first 2½ miles and a mileage rate of 2 cents for each additional mile. Mr. Abercrombie said that more revenue is necessary to maintain the present standard of service and keep up the financial standing of the company.

**Higher Fares in Easton Denied.**—The Board of Public Service Commissioners of New Jersey has refused to grant to the Northampton, Easton & Washington Traction Company, Easton, Pa., permission to increase its fares on the line between Phillipsburg and Port Murray, N. J. The road was constructed in 1906, and covers 17 miles. The commission bases its decision on the Supreme Court ruling that an ordinance fixing a reasonable rate of fare remains inviolable during the life of the franchise. The company operates under price-fixing ordinances in its different zones, but asked the right to increase the fare in the zones from 5 cents to 6 cents. The deficit for last year was claimed to be $5,311 and was attributed to the cost of materials and labor.

**Philadelphia & Western Gets Increase.**—The Philadelphia & Western Railway, Upper Darby, Pa., has increased its fares after having had its application for permission to raise its rates advertised and filed with the Public Service Commission for thirty days. The changes in rates affect the price of one-way and ten-trip tickets, the increases being from 1 cent to 6 cents per trip. No change was made in the commutation rates. In its notices to the public the company called attention to the abnormally high operating costs as being responsible for the necessity for increasing rates. The change in fare schedules was contemplated for some time but action was postponed in the hope that conditions both local and national would improve. Before the effective date of the increases no opposition had been made. Since that time two complaints have been filed with the commission, but no action has yet been taken by that body in connection with the case.

**Bonuses for St. Louis Men.**—Richard McCulloch, president of the United Railways, St. Louis, Mo., has announced the establishment of a bonus system for the benefit of the transportation employees, to encourage skill and care, with an expected resultant decrease in the expense for injuries and damages and maintenance cost, greater regularity in operation, increase of average speed and increase of receipts per mile. Gains resulting from increased efficiency will be divided as follows: 40 per cent to the employees, 40 per cent to the company and 20 per cent for the necessary clerical work in connection with the bonus system. The employees' share will be divided equally among the transportation employees, except that part resulting from saving in the injuries and damages account, of which 60 per cent will go to the motormen and 40 per cent to the conductors. The participation of the trainmen will be determined by crediting each employee with 1000 points at the beginning of each month and penalizing them for preventable accidents or infractions of the rules. Only those having more than 750 points to their credit at the end of the month will share in the bonus.

# Legal Notes

Connecticut.—*Collision with Car Which Indicated It Was About to Stop.*

Where a team driver knew the custom of a street railway company to stop its cars on one side of the street to take on passengers, and he observed a car slowing down at such corner and a person preparing to board it, and thereupon drove upon and across the tracks and was injured by the car, which did not stop, it was a question for the jury whether he was contributorily negligent. (Middleton v. Connecticut Company, 100 Atlantic Rep., 1062.)

Kansas.—*Injury to Person at Station Between Platform and Car.*

In an action against an interurban electric railway company, the plaintiff's evidence tended to show these facts: He came to the company's station about dusk with friends who were leaving. After they had boarded the car, and before it started, he went down into the space between it and the station platform to look for a coin his daughter had dropped. Passengers were received and discharged by a gangplank laid to the rear steps. As the defendant was stooping over, facing away from the car, it started without any signal being given, and he was struck by the rear step. Held: in the aspect most favorable to the plaintiff, he was but a licensee while in the place between the platform and the track, and the company owed him no duty to give him warning of the starting of the car. If such a duty had been owing to him, his own failure to use reasonable care for his safety would bar a recovery. (Senning v. Arkansas Valley Interurban Railway, 165 Pacific Rep., 863.)

Kentucky.—*Negligence Must Be Proximate Cause of Injury—Liability for Delay.*

That a traction company was negligent in using defective coal, thereby causing a car to stop, did not render it liable for injury to a passenger from falling on a trestle while walking down the track toward her destination after she had voluntarily left the car, where it did not appear that defendant's negligence was the proximate cause of her injuries. Where failure of a passenger to reach his desination on schedule time is due to the carrier's negligence, the carrier is liable only for such damages as flow directly from the delay and which the carrier might reasonably have anticipated at the time of contracting. (Paducah Traction Company v. Weitlauf, 195 Southwestern Rep., 99.)

Massachusetts.—*Duties to Elderly Passengers When Alighting.*

It is not a requirement of due care on the part of a conductor of an electric car to give the signal for an emergency stop simply because a passenger advanced in years rises from his seat in an open car and steps on the running board and stands there for a moment with a hold upon the post of the car. (Bigelow v. Boston Elevated Railway, 115 Northeastern Rep., 250.)

Massachusetts.—*Liability for Charged Pole Near Footpath.*

Where a car shifter for an electric railway was told that a trolley support was charged with electricity and he knew that people would be likely to be in the vicinity thereof and that wire had been dumped close to the post, and it was his duty to report the condition to his superior officer, and for a long time prior to the accident children and other persons without the railway's permission but with knowledge of the division superintendent and other employees had used the path, his failure to report the condition constituted reckless or wanton negligence. (Romana v. Boston Elevated Railway, 116 Northeastern Rep., 218.)

Michigan.—*Cattle on the Highway.*

For a farmer to drive domestic animals slowly along a highway is as legitimate a use of the highway as the running of high-speed interurban cars along it. (Bewernitz v. Detroit, Jackson & Chicago Railway, 161 Northwestern Rep., 976.)

# Personal Mention

**S. H. Carr** has been elected vice-president of the Tulsa (Okla.) Street Railway to succeed C. W. Eliff.

**M. R. Barkwell** has been appointed secretary-treasurer of the St. Thomas (Ont.) Street Railway to succeed C. T. Boughuer.

**W. T. Scott** has been appointed comptroller and purchasing agent of the International Transit Company, Sault Ste. Marie, Ont.

**J. A. Van Clostere** has been elected vice-president of the Gulfport & Mississippi Coast Traction Company, succeeding W. T. Stewart.

**W. McKinley**, Chicago, has been elected vice-president of the Alton & Jacksonville Railway, Alton, Ill., succeeding W. C. Fordyce.

**Howard Duff** has been appointed superintendent of power of the Lehigh Valley Transit Company, Allentown, Pa., to succeed George T. Bromley.

**Edward Early**, formerly assistant to the auditor of the United Railways & Electric Company, Baltimore, Md., has been appointed assistant treasurer.

**William Hayward**, of the Public Service Commission for the First District of New York, has been mustered into the federal service as colonel of the Fifteenth Infantry, New York National Guard.

**W. J. Lynch**, treasurer and comptroller of the Quebec Railway, Light, Heat & Power Company, Ltd., Quebec, Que., has been appointed general manager of the company to succeed H. G. Matthews, deceased.

**Henry W. Hodge**, member of the Public Service Commission for the First District of New York, has resigned from the commission to accept an offer of the government to go to France as a bridge engineer.

**Robert V. Massey** has been appointed general superintendent of the Eastern Pennsylvania Division of the Pennsylvania Railroad, which includes the Paoli Electric Division, with headquarters at Altoona, succeeding the late George W. Creighton.

**S. A. Foltz** has resigned as secretary, treasurer and general manager of the Mansfield Public Utility & Service Company, Mansfield, Ohio, to devote his attention to his personal interests in Mansfield. Mr. Foltz will be succeeded by P. Barnhard.

**Matthew C. Brush**, president of the Boston (Mass.) Elevated Railway, is, according to rumors which have appeared in a number of newspapers, under consideration by the directors of the Chicago, Milwaukee & St. Paul Railway for the presidency of that road.

**H. A. Rhoads** has recently been appointed master mechanic of the Youngstown & Ohio River Railroad, Leetonia, Ohio. Prior to his connection with that company Mr. Rhoads was employed as machinist with the Columbus Railway & Light Company, Columbus, Ohio, for more than eight years. He was also master mechanic of the Ohio & Southern Traction Company for six years.

**Henry W. Anderson**, general counsel for the Virginia Railway & Power Company, Richmond, Va., has been named chairman of a Red Cross Commission to Roumania. A Red Cross medical unit of twelve doctors and twelve nurses will accompany the commission, which is the third to be sent to Europe since the organization of the war council. The commission will undertake, in addition to its investigation of sanitary and health conditions, actual relief work among the Roumanian refugees.

**W. L. Barker**, electrical engineer of the Southern Utilities Company, which consists of electric, gas and ice properties in Florida, has resigned to accept the position of electrical engineer of the Manila Electric Railroad & Light Company, Manila, P. I. Both of these companies are under the management of The J. G. White Management Corporation, New York, N. Y. Before joining the organization of the Southern Utilities Company, Mr. Barker was connected with the staff of the General Electric Company. He is a graduate of the Alabama Polytechnic Institute.

**J. D. Nailor** has been appointed superintendent of transportation of the Buffalo, Lockport & Rochester Railway, Rochester, N. Y. Mr. Nailor was born in Glens Falls, N. Y., in 1886. He entered railway work in June, 1906, as conductor for the Hudson Valley Railroad, Glens Falls Division, and was made motorman in 1907. In the following year he resigned to accept a position as motorman on the Buffalo, Lockport & Rochester Railway and later served successively as third and second trick dispatcher. In March, 1914, Mr. Nailor was appointed chief dispatcher, the position he has held until his recent promotion.

**Sir Albert Stanley**, in his capacity of president of the Board of Trade of Great Britain, on May 17, made his first address before the House of Commons. He spoke for an hour presenting the annual estimates of the board. His speech was well received and its presentation was made the occasion of complimentary references to his work in the traction field, as director of munitions transport and finally as a member of the government. He presented to the House a plan for the establishment of the British Trade Corporation which would have for its purpose the promotion of large enterprises abroad.

**George Applegate** has recently been appointed master mechanic of the Salem & Penns Grove Traction Company, Salem, N. J. Mr. Applegate has been engaged in railway work for twenty-eight years. He was with the Philadelphia (Pa.) Rapid Transit Company for thirteen years. Subsequently he was master mechanic of the Trenton & New Brunswick Railroad. He next became general foreman of the Atlantic City & Shore Railroad, Atlantic City, N. J., and then went to the Washington, Baltimore & Annapolis Railroad, Baltimore, as armature winder. It was from that position he resigned to become connected with the Salem & Penns Grove Traction Company.

**C. P. Westlake** has been appointed general manager of the Goldsboro (N. C.) Electric Railway to succeed R. Harold Smith. Mr. Westlake has long been engaged in railroad and electric railway work. He served his apprenticeship as machinist with the Southern Railway. Shortly thereafter he entered the electric railway field with the Columbia Railway, Gas & Electric Company, Columbia, S. C. During the fifteen years that he served with that company Mr. Westlake acted as dynamo tender, armature winder, foreman of shops, master mechanic, superintendent and superintendent of maintenance. Previous to becoming connected with the Goldsboro Electric Railway he was with the Southern Car Company, High Point, N. C., in charge of the electrical and air-brake department.

**W. H. McHenry** has been elected vice-president of the Inter Urban Railway, Des Moines, Iowa, to succeed Edward P. Smith. Judge McHenry, who is one of the most widely known lawyers in Iowa, has been general counsel and head of the claim department of the Des Moines City Railway since Jan. 1. He is a native of Des Moines and after the successful practice of law in that city for a long period he was made judge of the district, where he served for fourteen years. Following his recent retirement from judicial duties at the age of fifty-five he took up the important legal work for the local railway system. The safety-first work of the Des Moines City Railway, referred to in the ELECTRIC RAILWAY JOURNAL for Nov. 25, 1916, page 1130, which was begun on Jan. 1, was directed by Judge McHenry, assisted by Dan M. Finch, claim agent of the company, in direct charge of the work.

## Obituary

**Henry G. Matthews**, general manager of the Quebec Railway, Light, Heat & Power Company, Ltd., Quebec, Que., died at the Jeffery Hales Hospital. Mr. Matthews was born in Montreal in 1878 and received his education at the Montreal high school. Before becoming associated with the Quebec company in 1911 he was manager of the Marconi Wireless Telegraph Company of Canada. He was also president of the Lotbinière & Megantic Railway Company and a director of the subsidiary companies of the Quebec Railway, Light, Heat & Power Company, Ltd.

# Construction News

Construction News Notes are classified under each heading alphabetically by States.

An asterisk (*) indicates a project not previously reported.

## FRANCHISES

**Calistoga, Cal.**—The San Francisco, Napa & Calistoga Railway has abandoned its franchise in Calistoga north of Lincoln Avenue. The company has decided that it will not extend its lines north of Calistoga and all construction work done beyond the present terminal in the town will be removed.

**Valdosta, Ga.**—The Valdosta Street Railway has asked the Railroad Commission of Georgia for permission to take up its tracks from Pine Park to the cotton mills and to construct a line from West Hill Avenue along Pearl, West Gordon, Johnson and Ann Streets to North Patterson Street, completing a belt line which has been in contemplation. The permission of the City Council has been received for this change.

**Louisville, Ky.**—The Louisville Railway has been granted a permit to build a switch into the property of the Bourbon Stockyards. This will be available for handling shipments of live stock from the country lines and making deliveries of them to the pens in which they will be sold. Heretofore the company has had to unload at its freight depot and the stock has been transported the remainder of the way in wagons.

**Lincoln, Neb.**—The Lincoln Traction Company has asked the Nebraska State Railway Commission for six months' extension of time on its franchise in which to construct a line to Omaha.

**Dayton, Ohio.**—The City Railway has asked the City Commission for a franchise to construct an extension on Kammer Avenue to Westwood Avenue, on Westwood Avenue north to Hoover Street and two blocks on Hoover Street.

**Seattle, Wash.**—A bill has been introduced in the City Council and referred to the franchise committee, granting a street railway franchise to A. A. Phinney, R. V. Ankeny and David P. Eastman, extending on various streets, between Carleton Park Addition and Fifteenth Avenue West at West Wheeler Street. Messrs. Phinney, Ankeny and Eastman have expended $500,000 in the development of Carleton Park, overlooking Puget Sound in the Magnolia Bluff District. It is proposed to construct an electric railway and turn it over to the Puget Sound Traction, Light & Power Company to operate. The proposed franchise will expire on Dec. 21, 1934, the same date as the traction company's franchises expire.

## TRACK AND ROADWAY

**Los Angeles & San Diego Beach Railway, San Diego, Cal.**—The Los Angeles & San Diego Beach Railway has filed with the Council of San Diego an ordinance permitting removal of that portion of the company's tracks in La Jolla on Prospect Street extending from Cave Street to a junction with the present track between Culver and Silverado Streets. Abandonment of its franchise for this portion of the road also is asked. The request is to be subject to approval of the State Railroad Commission.

**Caldwell (Idaho) Traction Company.**—Officials of the Caldwell Traction Company have given assurances that its present line to McNeil's Station will be extended to tap the Snake River Valley. Walter R. Sebree, president of the company, and Carl E. McStay, who is affiliated with Mr. Sebree in the undertaking, are planning a new town near the Nampa Ferry, where the extension will terminate. Recently officials of the company announced their intention of floating a loan of $100,000 on the company's properties, now having no outstanding indebtedness. With the money thus obtained it is planned to make various extensive improvements to the system.

**Railway Securities Corporation, Harvel, Ill.**—L. J. Magill, Rock Island, has been appointed receiver for the Railway Securities Corporation, the company having filed an involuntary petition in bankruptcy. It was incorporated to build an electric line between Springfield and Hillsboro.

**Peoria (Ill.) Railway.**—This company is reconstructing its tracks in East Peoria to Farm Creek. The tracks are being removed from the side of the street and are being placed in the center.

**Des Moines (Ia.) City Railway.**—Work has been begun by the Des Moines City Railway double-tracking its Fort Des Moines line from Walnut Street across the Seventh Street bridge.

**Louisville (Ky.) Railway.**—All details as to the service the Louisville Railway will give to the Federal Army Cantonment, which is being constructed south of Louisville, have been settled, and the company will begin immediately the construction of the additional trackage. About 2½ miles of single track and about 1 mile of double track will be built. The company will double-track the Preston Street interurban line to Coke Station, at which point the cantonment line will be deflected and penetrate the camp grounds for a distance of 1 mile. Material for the construction is at hand and it is expected that the new line will be ready by Sept. 1. The spur into the camp will leave the line of the Preston Street track about half way out to its terminus at Okalona, and the haul from its terminus to the city will be 6 miles, with transfers good on all lines to which the Preston Street cars usually transfer. The fare will be 5 cents and the large double-truck cars used on the Preston Street line will be used in the camp service. Traffic requirements on the western end of the new line will not be increased and it is probable that a loop will be arranged for downtown.

**Shelbyville & Frankfort Realty Company, Shelbyville, Ky.**—Interest in the project to connect Shelbyville and Frankfort with an electric railway line and thus connect the Louisville & Interurban Railway with the Kentucky Traction & Terminal Company has been revived. F. C. Dunn, secretary of the Chamber of Commerce of Frankfort, has announced that negotiations looking toward the financing of the project by Eastern concerns have been begun and that a meeting has been arranged at which the details of the project will be gone over. [Dec. 30, '16.]

**Washington, Baltimore & Annapolis Electric Railway, Baltimore, Md.**—This company will expend about $350,000 on the construction of extensions to the cantonment at Admiral. Work is already under way on the grading of a tract of land on which will be laid 2 miles of double tracks from the company's main lines at Odenton to Admiral and into the cantonment itself.

**Detroit (Mich.) United Railway.**—Work has been started on reconstruction work on the track foundations along Woodward Avenue and paving between the tracks of the Detroit United Railway between the Detroit Terminal Railroad crossing and the Six-Mile Road, in Highland Park. The work will take about five weeks. New concrete foundations will be put in with the exception of the approaches to the Terminal Railroad crossing. At this point the foundation and tracks will be repaired and put into first-class shape, but permanent foundations will be delayed until such time as the subway is built to separate the grades. It is expected that work on the subway will be started within a year.

**Michigan Railway, Kalamazoo, Mich.**—It is reported that this company will construct an extension from Lansing to Grand Ledge at a cost of about $175,000.

**McComb & Magnolia Railway & Light Company, McComb, Miss.**—A report from this company states that grading has been begun on this company's proposed road to connect McComb, Magnolia and Summit. Construction of a new power house at Fernwood was begun in June. Guy M. Walker, 61 Broadway, New York, president. [July 7, '17.]

**Hampton & Langley Field Railway, Hampton, Va.**—A communication from C. Loomis Allen, president of Allen & Peck, Inc., states that the Hampton & Langley Field Railway, which will connect Hampton with the Langley Aviation field, will be operated by the Newport News & Hampton Railroad when completed. [April 21, '17.]

## SHOPS AND BUILDINGS

**Petaluma & Santa Rosa Railway, Petaluma, Cal.**—A new station will be built by the Petaluma & Santa Rosa Railway at Sebastapol. The building will be 40 ft. x 60 ft., and will be constructed of metal lath and plaster with a stucco finish.

**Sioux City Service Company, Sioux City, Ia.**—This company reports that it is constructing an addition to its carhouse.

**Washington, Baltimore & Annapolis Electric Railway, Baltimore, Md.**—This company will construct a new station in connection with its extension to the cantonment at Admiral.

**Worcester (Mass.) Consolidated Street Railway.**—This company has purchased the property at Grove Street, Sagamore Road and Park Avenue, containing 312,165 sq. ft., on which it will construct a carhouse, repair shops and administration buildings.

**Interborough Rapid Transit Company, New York, N. Y.**—The contract for the station finish at the Thirty-fourth Street and Times Square stations of the Broadway subway has been awarded by the Public Service Commission for the First District of New York to A. W. King & Company, Inc., New York, the lowest bidder, at $178,722. Under the contract the work must be completed within five months.

## POWER HOUSES AND SUBSTATIONS

**Fort Smith Light & Traction Company, Fort Smith, Ark.**—This company has completed a high-tension transmission line to Huntington to supply the Coal District Power Company with electricity. The company has also ordered material for an extension of its lines to furnish wholesale power to the Citizens' Electric Company, which supplies the electrical requirements of Alma, Mulberry and Ozark. Power to the extent of 1000 hp. will be furnished the Coal District Company and the Fort Smith Company will enlarge its generating capacity at Fort Smith to provide additional power for this and other new business which it has secured.

**Des Moines (Ia.) City Railway.**—This company will install a new turbine in its power house, doubling the capacity of the plant. A substation will be built south of South Park to increase the carrying capacity of the Fort Des Moines line. Another substation is being completed at East Second and Walnut Streets to handle the east side and still another is being completed at West Fourteenth Street to supply the interurban and part of the city lines. A new station will also be erected at Polk Boulevard and Chamberlain Avenue for the west lines.

**Duluth (Minn.) Street Railway.**—The City Council of Duluth has granted permission to the Duluth Street Railway to string two feed wires of 500,000-cm. capacity each in a double cable over the Aerial Bridge across the Duluth ship canal to connect with the circuit of the Park Point Traction Company, which was recently taken over by the Duluth Street Railway. The power plant of the Park Point Traction Company will be used only for emergency purposes after the connections are made across the ship canal.

**New Jersey & Pennsylvania Traction Company, Trenton, N. J.**—The Eureka Power Company, a subsidiary of the New Jersey & Pennsylvania Traction Company, has been granted permission by the Public Utility Commission to erect poles along the River Road from Ewing Township to the Hunterdon County boundary line. The lines will be extended from Washington's Crossing to Titusville and Pennington.

**Hocking-Sunday Creek Traction Company, Nelsonville, Ohio.**—This company will erect a substation at a cost of $10,000.

**Monongahela Valley Traction Company, Fairmont, W. Va.**—Surveys have been made and right-of-way secured by the Monongahela Valley Traction Company for the erection of 30 miles of electric transmission lines to furnish energy to various coal mines.

**St. Albans & Swanton Street Railway, St. Albans, Vt.**—This company reports that it has purchased 2650 kw. generators for the Public Electric Light Company, to be installed at its Fairfax plant.

# Manufactures and Markets

Discussions of Market and Trade Conditions for the Manufacturer, Salesman and Purchasing Agent
Rolling Stock Purchases Market Quotations Business Announcements

## Present Friction and Rubber Tape Situation

### Uncertainties of the Future Force Short-Time Contracts—Need of Care in the Conservation of Raw Materials

BY EDGAR E. FAY

Sales Manager Boston Woven Hose & Rubber Company

Never before in this country's history has manufacturing been carried on with so many difficulties and uncertainties. From every angle handicaps are imposed which make economical manufacturing impossible, and aside from the inreased costs, bring delays and disappointments which cannot be foreseen. When the first shock was over after the European war was declared there was a substantial increase in the demand for tapes from the foreign trade. As the manufacturing of England and her allies became more and more concentrated on the work of producing for the direct needs of the armies and the requisitions for munitions and other supplies were shifted over to this country, the demand for tape followed accordingly. Since the United States entered actively into the conflict, the demand has further ncreased, until we are now producing at the rate of 8,000,000 to 10,000,000 lb. per year.

### THE RAW MATERIAL MARKET

The advances during the entire period of the war have practically been constant. This is particularly true of the materials and supplies produced in this country such as cotton fabrics of all descriptions, paper boxes, wire, etc., showing advances all the way from 25 to 300 per cent. With the advance of costs the uncertainty of supply increases. Then there is shortage and uncertainty of labor, the transportation difficulties, and all told the problems which confront every manufacturer increase in direct proportion to the number of ingredients he uses in his operations.

These difficulties make the simplification of manufacturing a vital necessity, and the greatest uniformity and best service can be given where buyers order stock goods rather than special constructions or even special brands. The reason for this is obvious, for there is a constant flow of standard goods pouring through the factory all the time. Where special goods are ordered, the manufacture is intermittent and production is consequently retarded.

### ALL-INCLUSIVE HELPFULNESS TO SAFEGUARD CONSUMERS

While service has always been one of the important features of our business, the conditions which have obtained for the past two years have forced us to organize a special service department. Every possible effort is made to overcome the handicaps imposed upon us and give our customers service. If the materials for which we have contracted do not come in time, we have made it a practice to secure supplies near at hand, even at atrociously higher prices, if they are obtainable. When this country entered the war and boats shipping from the South ceased for fear of submarines, we brought ducks, sheetings and yarns on by express. When there was a coal shortage here in New England because of congestions in the transportation lines, we bought coal locally at local war prices so as to keep the factory running. As we have no distributing branches of our own but are "manufacturers for jobbers," we endeavor to support our distributers in two important features of business conduct, quality of product and service, in order that together we may build strongly a business that will result to our mutual benefit and satisfaction.

The uncertainties of the future are such that we cannot take undue risks, either for ourselves or for our customers, and all engagements which contemplate future delivery are made for short terms only and are accepted subject to war clauses. It has been impossible to get materials in sufficient quantities for manufacturing. Not a week goes by that we do not have to close down some department for one reason or another, and now the government is requisitioning not only our plant but the sources of supply in many lines, which simply adds to the confusion and uncertainty. But we are good sports and when we think of the young men shortly going to the front, we are glad to "do our bit" as far as lies within our power.

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## Wire Manufacturers Co-operate with Government

### Committee Formed to Accept All Orders, Make Binding Prices and Apportion Orders Out Among Manufacturers

Insulated wire and cable manufacturers have been very active in lending their support to the government since a state of war was declared. Immediately the United States entered the war practically every wire manufacturer placed his entire organization at the disposal of the national government.

Now this co-operation is taking on a more tangible form. The manufacturers were called to Washington recently to confer with navy officials and at that time three of their number, LeRoy Clark of the Safety Insulated Wire & Cable Company, Edward Sawyer of the Atlantic Insulated Wire & Cable Company and Wallace S. Clark of the General Electric Company, were appointed a committee to represent the entire insulated wire and cable industry in connection with purchases of wire by the Navy Department. It was then agreed that all navy orders for insulated wire should pass through this committee's hands. The prices would be fixed between this committee and the Navy Department and the committee would distribute all work of manufacture, the distribution to be made according to the capacity of the plant and to the ability of the manufacturer to ship promptly.

The wire manufacturers have agreed to these conditions and already they are in force and orders have been placed by the government in accordance with them. From the standpoint of the government this offers one of the best possible ways of placing orders. No favoritism is shown and orders are placed in such a way as least to disrupt the market and assure quickest deliveries. No individual manufacturer is loaded down with government business, the market is stabilized, and the effect on the trade is much smaller than it would be otherwise. Prices are based on a certain wire base, the copper for which the government agrees to furnish. By the manufacturer, of course, this is welcomed, because he does not have to sell to the government his own stock of copper at considerably less than he paid for it or could replace it for.

The first order was for 1,000,000 ft. of lead-covered submarine cable, which was wanted right away. This order, which would normally have required eighteen months to fill, was accepted and deliveries commenced in thirty days. In sixty days the order was completed. This order was followed by orders for several million feet of other kinds of cable, which were apportioned among sixteen manufacturers.

Prices on this business, it is understood, were much better than the government could have made in the market, and deliveries were much quicker than they would otherwise have been. Therefore, from the standpoint of the government, this method of handling orders has been found to be very satisfactory and very reasonable.

## Coal Situation Serious

### International Traction Buys Mine to Insure Winter's Supply—New England's Supply Increasing—Government to Report on Conditions Weekly

With the exception of the question of increased fares, the most important thing in the minds of leading electric railway executives is the present coal situation, which it must be admitted is a most important one. Conditions existing in the Middle West were made plain by Frank J. Petura, purchasing engineer of the H. L. Doherty Company, in the March 31 issue in these columns, and since that time a number of railways have combined forces and purchased coal mines in order to guarantee an adequate supply of coal for the coming winter. These roads include the Terre Haute, Indianapolis & Eastern Traction Company, the Indianapolis Traction & Terminal Company, the Union Traction Company of Indiana and the Fort Wayne & Northern Indiana Traction Company. Also, the W. S. Barstow & Company interests acquired coal mines for the use of its subsidiaries. The latest company to purchase a mine is the International Traction Company, a subsidiary of the United Gas & Electric Corporation. It has purchased a mine in the Pittsburgh district which is producing 150,000 tons annually, and the company will thus be able to furnish coal to its lines in Buffalo at normal prices. The railways will require only 50,000 tons, leaving the surplus available for sale. Other large properties are expected to follow suit on the theory that this is the only positive way of insuring the winter's supply.

#### NEW ENGLAND GETS SLIGHT RELIEF

The committee on coal production and distribution of the Advisory Commission of the Council of National Defense, of which F. S. Peabody is chairman, has been deluged with telegrams asking for assistance in obtaining coal and this committee has been doing everything in its power to get consumers in touch with producers or agents. That New England is getting relief is attested to by the fact that all previous records were broken on the New Haven Railroad during May and June in the number of cars of all-rail coal handled by this company. The total number of cars of both all-rail and tidewater coal handled by the New Haven in May was 21.850, and in June 20.707. This compares with 15,546 in May and 17,466 cars in June, 1916. Of the 21,850 cars handled in May, 17,168 cars were of all-rail coal, which is the largest number of all-rail coal cars handled in the company's history.

#### GOVERNMENT REPORTS ON CONDITIONS

Weekly statistics showing what the soft-coal miners of the country are doing, and why they are not doing more, are now being collected by the United States Geological Survey under the direction of Secretary of the Interior Lane. With all the information available from the already organized operators' associations, which represent about 25 per cent of the production of the country, the committee on coal production is able to concentrate its efforts where the greatest stringency lies—whether, as in most localities, the trouble is lack of cars, or whether it is labor shortage. Some of the important producing districts, particularly Alabama, West Virginia, parts of Pennsylvania, Ohio, and the territory from Texas to Iowa, figures from which are not shown in this first statement, are being rapidly organized for this purpose and have already furnished partial information.

The figures collected indicate that the bituminous mines of the country are at present working to 75 per cent of their capacity possible by utilizing the labor force at present available. The ratios of tonnage produced to full-time capacity for the three weeks ending June 23, June 30 and July 7 for twelve operators' associations are 72.9 per cent, 71.4 per cent and 76.5 per cent respectively. The increase in percentage of full-time capacity produced from 71.4 for the week ending June 30 to 76.5 per cent for the week ending July 7 is attributed to the fact that the mines were shut down on July 4, and the railroads were therefore able to supply more of the cars ordered for the remainder of the week.

Actual tonnage losses, below full-time capacity, as reported by six associations representing approximately one fifth of the production of the country for the weeks ending June 23, June 30 and July 7, were 500,000 tons, which would indicate that the weekly output of mines of the whole country is not less than 2,000,000 tons below full-time capacity. By far the greatest factor concerned in the losses was the inadequate car supply. Thirty-one per cent of the total full-time capacity of these representative mines was lost because the supply of cars at the mine mouth was insufficient. Other important causes were labor deficiency, crippling the industry to 4.5 per cent of its full-time capacity, and mechanical breakdowns within the mines to which losses amounting to 3.2 per cent of the full-time output were attributed.

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## New Financing for General Electric

J. P. Morgan & Company and Lee, Higginson & Company, New York, on July 19 offered for subscription at 99¾ and interest, to yield about 6.10 per cent, $15,000,000 of three-year 6 per cent gold notes of the General Electric Company. These notes are dated July 1, 1917, and are available in coupon form in $1,000, $5,000 and $10,000 denominations, registerable as to principal. The issue was oversubscribed more than 100 per cent.

Apart from these notes the only debt of the company is represented by $12,047,500 of debentures. The net income available for interest in 1916 amounted to more than thirty-three times the interest requirements. The $15,000,000 of new money, it is reported, will bring working capital, in connection with surplus accumulated during the last six months, above the $100,000,000 mark.

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The United States Steel Corporation's orders on hand on June 30 amounted to 11,383,287 tons, which is a decrease of 504,304 tons as compared with the orders on May 31. This showing is regarded as favorable because of the refusal of this corporation's subsidiaries to sell additional capacity pending the settlement of the price question by the government.

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## NEW YORK METAL MARKET PRICES

| | July 19 | July 26 |
|---|---|---|
| Prime Lake, cents per lb | 26½ | 26 |
| Electrolytic, cents per lb | 26½ | 26 |
| Copper wire base, cents per lb | 36 | 36 |
| Lead, cents per lb | 10½ | 10¼ |
| Nickel, cents per lb | 50 | 50 |
| Spelter, cents per lb | 8⅞ | 8¾ |
| Tin, Straits, cents per lb | 62½ | 62½ |
| Aluminum, 98 to 99 per cent, cents per lb | 55 | 57 |

## OLD METAL PRICES

| | July 19 | July 26 |
|---|---|---|
| Heavy copper, cents per lb | 26½ | 24 |
| Light copper, cents per lb | 23½ | 21 |
| Red brass, cents per lb | 19½ | 19 |
| Yellow brass, cents per lb | 17½ | 16 |
| Lead, heavy, cents per lb | 9 | 8½ |
| Zinc, cents per lb | 6¼ | 6 |
| Steel car axles, Chicago, per net ton | $46.50 | $45.50 |
| Old car wheels, Chicago, per gross ton | $36.00 | $32.50 |
| Steel rails (scrap), Chicago, per gross ton | $43.00 | $43.00 |
| Steel rails (relaying), Chicago, per gross ton | $59.50 | $59.50 |
| Machine shop turnings, Chicago, per net ton | $19.00 | $17.50 |

## CURRENT PRICES FOR MATERIALS

| | July 19 | July 26 |
|---|---|---|
| Rubber-covered wire base, New York, cents per lb. | 36½ | 36½ |
| No. 0000 feeder cable (bare), New York, cents per lb. | 36½ | 36½ |
| No. 0000 feeder cable (stranded), New York, cents per lb. | 33¾ | 33¾ |
| No. 6 copper wire (insulated), New York, cents per lb. | 33 | 33 |
| No. 6 copper wire (bare), New York, cents per lb. | 36 | 36 |
| Rails, heavy, Bessemer, Pittsburgh | $38.00 | $38.00 |
| Rails, heavy, O. H., Pittsburgh, per gross ton | $40.00 | $40.00 |
| Wire nails, Pittsburgh, per 100 lb. | $4.00 | $4.00 |
| Railroad spikes, 9/16 in., Pittsburgh, per 100 lb. | $5.00 | $5.00 |
| Steel bars, Pittsburgh, per 100 lb. | $4.50 | $4.50 |
| Sheet iron, black (24 gage), Pittsburgh, per 100 lb. | $8.35 | $8.35 |
| Sheet iron, galvanized (24 gage), Pittsburgh, per 100 lb. | $9.55 | $9.55 |
| Galvanized barbed wire, Pittsburgh, cents per lb. | $4.85 | $4.85 |
| Galvanized wire, ordinary, Pittsburgh, cents per lb. | $4.65 | $4.65 |
| Cement (carload lots), New York, per bbl. | $2.22 | $2.22 |
| Cement (carload lots), Chicago, per bbl. | $2.31 | $2.31 |
| Cement (carload lots), Seattle, per bbl. | $2.60 | $2.60 |
| Linseed oil (raw, 5 bbl. lots), New York, per gal. | $1.13 | $1.12 |
| Linseed oil (boiled, 5 bbl. lots), New York, per gal. | $1.14 | $1.13 |
| White lead (110 lb. keg), New York, cents per lb. | 12¾ | 12¾ |
| Turpentine (bbl. lots), New York, cents per gal. | 40 | 42 |

## ROLLING STOCK

**Union Light & Power Company, Kansas City, Mo.,** has recently purchased five trailers which will be placed in service on the line to the Fort Riley cantonment.

**Tuscaloosa (Ala.) Railway & Utilities Company** is constructing an electric locomotive for which Brill trucks and Westinghouse electrical equipment have been ordered. The company will build the body.

**Columbia (S. C.) Railway, Gas & Electric Company** is reported to be in the market for four semi-convertible cars to be used in service to the cantonment near this property. The company is building four semi-convertible cars and expects to lay about five miles of double track.

**Northwestern Pennsylvania Railway, Meadville, Pa.,** has ordered six Birney one-man, double-end safety cars from the American Car Company, St. Louis, Mo. The following details have been specified:

| | |
|---|---|
| Number | 6 |
| Date of order | June 1, 1917 |
| Date of delivery | 60 to 90 days |
| Builder | American Car Co. |
| Type | Birney |
| Seating capacity | 30 |
| Weight (total) | 14,000 lb. |
| Over bumpers | 27 ft. 9½ in. |
| Over vestibule | 26 ft. 9½ in. |
| Width over all | 8 ft. 0 in. |
| Rail to trolley base | 12 ft. 6 in. |
| Body | Semi-steel |
| Interior | Birch stained mahogany |
| Headlining | Agasote |
| Roof | Arched |
| Air brakes | Westinghouse |
| Axles | Brill |
| Car trimmings | Bronze |
| Conduits | American Car |
| Control | G. E. |
| Couplers | Brill |
| Curtain fixtures | Curtain Supply |
| Curtain material | Pantasote |
| Dest. signs | Hunter Illuminated |
| Door mechanism, | Safety Car Devices |
| Fenders | H. B. Lifeguard |
| Gears and pinions, | General Electric |
| Hand brakes, | Brill—Pittsburgh Drop Handle |
| Heaters, | Peter Smith Trus Plank |
| Headlights | Golden Glow SM95 |
| Journal boxes | Brill |
| Lightning arresters, | General Electric |
| Motors | Two G.E.—258 Inside hung |
| Paint | Paint |
| Registers | None |
| Sanders | Brill |
| Sash fixtures | Brill |
| Seats | American Car special reversible light-weight cross seat |
| Seating material | Steel, birch veneer stained mahogany |
| Springs | Brill |
| Step treads | Feralum |
| Trolley catchers | Keystone |
| Trolley base | General Electric |
| Trolley wheels | General Electric |
| Trucks | Brill Special 78-M-1 |
| Ventilators | Brill Exhaust |
| Wheels | 26-in. cast wheels |
| Special devices, etc. | 100 per cent dead man control |
| Automatic braking and sanding devices | Made by Safety Car Devices Company |

**Michigan Railway, Jackson, Mich.,** has specified the following details for four all-steel, three-compartment motor cars and for two all-steel, double-end trailers which are being built by the St. Louis Car Company.

| | *All-Steel Motor* | *All-Steel Trailer* |
|---|---|---|
| Number | [illegible] | 2 |
| Name of road | Michigan Railway | Michigan Railway |
| Builder | St. Louis Car | St. Louis Car |
| Seating capacity | 6 | 52. |
| Weight (total) | 00,000 | 67,900. |
| Bolster centers, length | 6 ft. 0 in. | 30 ft. 2 in. |
| Length over bumpers | 1 ft. 0 in. | 53 ft. 1 in. |
| Length over vestibule | 9 ft. 0 in. | 51 ft. 1 in. |
| Width over belt rail | ft. 11 in. | 8 ft. 11 in. |
| Height, rail to roof | 12 ft. 10½ in. | 13 ft. 0 in. |
| Lower sill to roof | | 9 ft. 5 in. |
| Body | Steel | Steel. |
| Interior trim | Steel—imitation mahogany | Mahogany. |
| Headlining | ¼ in. agasote | 3/16 in. agasote. |
| Roof | Plain arch | Arch. |
| Air brakes | Westinghouse | Westinghouse. |
| Axles | Open hearth, heat treated | |
| Cables | St. Louis Car | St. Louis Car. |
| Bumpers | Rico anti-climber | Rico anti-climber. |
| Car trimmings | Bronze—St. Louis Car. | Bronze—St. Louis Car. |
| Conduits | St. Louis Car | St. Louis Car. |
| Control | Multiple unit | |
| Couplers | Tomlinson MCB. | Tomlinson. |
| Curtain fixtures | Forsyth No. 88 | Forsyth No. 88. |
| Curtain material | Pantasote No. 77 | Pantasote. |
| Designation signs | Illuminated. | |
| Trap door and steps | O. M. Edwards. | |
| Fenders | Railway co.'s design. | |
| Gongs | 14 in. air operated. | |
| Hand brakes | Ackley | Ackley. |
| Headlights | G E Luminous arc | |
| Heaters | Peter Smith O-C | Peter Smith O-C. |
| Journal boxes | Symington. | |
| Paint | Murphy ABC | Murphy ABC. |
| Sandbox | With Reliance Trap. | |
| Sash fixtures | O. M. Edwards | O. M. Edwards. |
| Seats | Hale & Kilburn | 23 Hale & Kilburn. |
| Seating material | Plush and leather | Plush and leather. |
| Step treads | Mason | Mason. |
| Trucks, type | Baldwin | Baldwin—trailer. |
| Ventilators | Automatic | Automatic |
| Wheels | FSC, 36 in. diam. | 36 in. diam., steel. |
| Special devices, etc. | Light Fixtures, Safety Car Heating Co.; Bolsters, fitted with Baltimore ball bearings and Perry roller side bearings. | West. signals. |

## TRADE NOTES

**Standard Underground Cable Company, Perth Amboy, N. J.** is building a new extension to its plant.

**Frederic de P. Hone & Company, New York, N. Y.,** engineers, announce the removal of their New York office to 13-21 Park Row.

**B. L. Yepson** has been elected second vice-president and general manager of sales of the National Fireproofing Company, Pittsburgh, Pa.

**J. H. McKelway** has been appointed sales manager of the Laclede Christy Clay Products Company, St. Louis, Mo., succeeding H. K. Lackland, resigned.

**R. M. Klein** has been appointed sales manager of the International Oxygen Company and will be located at the company's main office, 115 Broadway, New York.

**Duquesne Electric & Manufacturing Company, Pittsburgh, Pa.,** has been incorporated with a capital stock of $50,000 to manufacture electrical machinery, etc. E. A. Casey is treasurer.

**A. C. Cornell,** formerly house goods specialist in the St. Louis branch of the Western Electric Company, has been appointed sales manager of the Denver (Col.) branch house of that company.

**Alonzo B. Reed,** formerly with Charles T. Main, consulting engineer, Boston, Mass., is now associated with the power transmission sales office of the James Hunter Machine Company, Boston, Mass.

**General Electric Company, Schenectady, N. Y.,** has received bids for the construction of a reinforced concrete addition 135 ft. x 250 ft. at its Edison Lamp Works, Harrison, N. J., to cost about $200,000.

**L. S. Washington,** formerly a member of the transformer sales division of the Westinghouse Electric & Manufacturing Company at East Pittsburgh, has recently been transferred to the St. Louis office of that company as supply salesman.

**T. A. Gillespie Company, Gillespie, N. J.,** has been incorporated by Thomas H. Gillespie, H. S. Morrow and R. A. Johnson of New York City. The company is capitalized at $500,000 and proposes to do a general contracting and electrical engineering business.

**Sangamo Electric Company, Springfield, Ill.,** has established a service station on the Pacific Coast for recalibration and repairs of meters for the territory west of Salt Lake City. The service station is located at the factory of the Western Electro-Mechanical Company, Oakland, Cal.

**James A. Parker,** who has been associated with the United States Steel Products Company of New York for a number of years, has been appointed as steel expert by Secretary Redfield for the newly created Division of Export Licenses of the Bureau of Foreign and Domestic Commerce.

**National Carbon Company, Cleveland, Ohio,** has purchased the works and business of the American Carbon & Battery Company, St. Louis, Mo. With the exception of Henry Wrape, the president of the St. Louis company, who is retiring, the management and organization remains unchanged.

**World Harvester Corporation, New York, N. Y.,** has been chartered with a capital stock of $1,500,000 by D. Halley Barber, Herbert E. Monahan and Ruth Frackman, all of New York, N. Y. The company proposes to manufacture apparatus and mechanical devices operated by electricity and other power.

**J. D. Collier,** director of L. J. Healing & Company, Ltd., Tokyo, Japan, general engineers and contractors, is visiting America on a short business trip and expects to arrive in New York the first week in August. His headquarters while in New York will be care of W. J. Sparks, Inc., 17 Battery Place, New York.

**Bound Brook Oil-less Bearing Company, Bound Brook, N. J.,** announces that its new foundry being erected at plant No. 2, Lincoln, N. J., two miles east of the Bound Brook plant, will be ready for occupancy on Aug. 3. This building is of steel and brick construction, 60 ft. x 180 ft., and will materially increase the production of this company's output.

**Leeds & Northrup Company, Philadelphia, Pa.,** announces that its factory was closed from July 6 to July 18, during which time almost the entire force of the company took its vacation and all production work was stopped. The new factory addition, which will double the floor space, is nearly completed and the company proposed moving into it during the vacation period.

**Atlantic Welding Company** (formerly the Atlantic Welding Corporation), 30 Church Street, New York City, announces two important changes, one technical and the other commercial. First, the Gailor welded joints formerly installed under contract by this company will hereafter be offered to railways with a remarkably compact unit type motor-generator set and simplified apparatus for the Atlantic welding method, thereby permitting the installation of these electric arc-welded joints at minimum cost and maximum convenience. Second, the joints hereafter can be installed directly by the electric railway purchaser on a license basis, making use of the special motor-generator and other equipment, instead of having the work done by contract with the Atlantic Welding Company's forces.

**Calebaugh Self-Lubricating Carbon Company, Philadelphia, Pa.,** announces that it has been compelled to seek larger quarters for the manufacture of its "No-Spark" carbon brushes for use on motors and generators, and that after Aug. 1 its plant will be located at 1508 to 1518 Columbia Avenue. The offices, however, will remain at 1503 Columbia Avenue. Its sales representatives are: F. Steetler and B. C. Hilliard, Philadelphia, Pa.; F. A. Best, Atlantic City, N. J.; Frank Van Anden, New York; Charles A. Fine, Western Pennsylvania; Fred H. Dorner, Milwaukee, Wis.; R. C. Stage, Rochester, N. Y.; Moore-Handley Hardware Company, Birmingham, Ala.; Baltimore Electrical Supply Company, Southern territory; Quality Electric Works, Los Angeles, Cal.; Advance Machinery & Supply Company, Denver, Col.; Antiga & Co., Havana, Cuba, and the Electrical Equipment Company, Montreal, Canada.

**Holden & White, Inc., Chicago, Ill.,** announce that they have received orders for the following specialties: Anderson slack adjusters, purchased by the United Railways of St. Louis for 100 cars, and by the Omaha & Council Bluffs Street Railway for 40 cars; Garland ventilators, by the New York State Railways, Rochester Lines (Cincinnati Car Co.) for 25 cars, by the Pacific Gas & Electric Railway (American Car Co.) for new cars, and by the Fort Wayne & Northern Indiana Traction Company for cars being rebuilt in company shops; Wasson air-retrieving trolley bases ordered by the East St. Louis & Suburban Railway for the new all-steel cars to be used on its line to Alton; Columbia car equipment specialties, for the Chicago, South Bend & Northern Indiana Railway; Fort Dodge, Des Moines & Southern Railroad, Wisconsin Public Service Company and Chicago Surface Lines; Miller trolley shoe equipments for the International Railway, Chicago, North Shore & Milwaukee Railroad, Gary & Interurban Railroad, Fort Wayne & Northwestern Railway, Union Traction Company of Indiana, East St. Louis & Suburban Railway, Des Moines City Railway and Michigan Railway, and Perry-Hartman roller side and centering center bearings for the Interborough Rapid Transit Company, Chicago, Aurora & Dekalb Railroad, Fort Wayne & Northern Indiana Traction Company, Waterloo, Cedar Falls & Northern Railway, Oklahoma Union Traction Company (J. G. Brill Company), Winnipeg Electric Railway, Central Illinois Traction Company, Joliet & Eastern Traction Company and Evansville Railways.

## NEW ADVERTISING LITERATURE

**Wagner Filing Methods Company, New York, N. Y.:** A 16-page catalog on indexing subjects, firms, individuals and records.

**General Electric Company, Schenectady, N. Y.:** A leaflet on special outfits for recharging ignition and lighting batteries.

**American Steel Export Company, New York, N. Y.:** A booklet, "Export Engineering and Contracting," which deals with the export organization of this company.

**International Money Machine Company, Reading, Pa.:** A pamphlet of payroll machinery giving brief descriptions of machines for adding, listing, recording, scheduling and paying out money.

**Ford, Bacon & Davis, Engineers, New York, N. Y.:** A bulletin, "Recent Construction Work," giving descriptions an dillustrations of a double-deck wharf on Pier 41 at Galveston, Tex., showing construction features, plans, specifications, etc.

**Gardner Machine Company, Beloit, Wis.:** A complete 120-page catalog on grinding machines, abrasive materials and accessories. Contains a section on tables, specifications, prices and other useful information.

**Colonial Steel Company, Pittsburgh, Pa.:** Catalog No. 16 gives specifications for tool, alloy and special steels with lists of extras and methods of treatment. Articles made from various steels are shown and processes of manufacture illustrated.

**Lidgerwood Manufacturing Company, New York, N. Y.:** Bulletin No. 20, giving a complete line of electric hoists designed especially for contracting work, special hoisting duty, etc. General descriptions, illustrations and tables of sizes and capacities of the different hoists are given.

## New Publication

**Properties of the Calcium Silicates and Calcium Aluminate Occurring in Normal Portland Cement.** This is the title of a report recently issued as Technologic Paper No. 78 by the Bureau of Standards. Copies can be obtained from the superintendent of documents, Government Printing Office, Washington, D. C., for 25 cents each.

**Electric Central Station Distribution Systems.** Revised and enlarged edition. By H. B. Gear and P. F. Williams. D. Van Nostrand Company, New York. 457 pages, 187 illustrations. Cloth, $3.50 net.

While, as the title indicates, this book is addressed particularly to distribution engineers of central stations, there are many features of interest to electric railway engineers, especially those connected with companies engaged in the sale of industrial power. The authors occupy responsible positions with the Commonwealth Edison Company of Chicago, and the text reflects their extensive experience, particularly in cable installation and overhead-line construction. The book is practical rather than theoretical, but fundamental principles are cited when necessary. In a treatise on a subject like this little of novelty is to be expected, its principal value lying in the fact that the reader secures much first-hand information as to the merits of certain schemes and practices. It also forms a convenient handbook in its particular field.

**Abstract of the Census of Manufacturers.** United States Bureau of the Census. Government Printing Office, Washington, D. C. 722 pages bound in cloth, 65 cents per copy.

Statistics of 340 separate manufacturing industries are presented in the abstract of the census of these branches of production that has been issued by the United States Bureau of the Census. Among the details given are those relating to number, size and character of ownership of establishments, and States in which located; proprietors, officials, salaried employees, and wage-earners, classified according to sex and, in the case of wage-earners, according to whether over or under sixteen years of age; salaries and wages paid; power used; fuel consumed; cost of materials; value of products; quantities of principal products, and various other items. Statistics somewhat similar in scope but in less detail are given, with reference to all industries combined, for each State and geographic division and for each of the leading 130 cities. This inquiry, which related to the calendar year 1914, was made in 1915, and the primary or fundamental data derived from it, together with some details as to kinds and quantities of the various classes of products, were issued some time ago in the form of several series of press summaries. The abstract presents, in convenient form, with an alphabetical index, all the information that will be needed by the great majority of persons who have use for the manufacturers' statistics.

# When Xerxes Wanted Greece

he wanted to conquer it in a hurry. To him the natural thing was to overwhelm the enemy by brute force.

So he crossed the Hellespont with about two million men.

Greece, with a smaller force of men, but with greater intelligence, defeated Xerxes.

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### *Take the 12/52 Peacock, for example*

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50 lb. applied on a 14" handle gives a chain tension of 1565
75 lb. applied on a 10" handle gives a chain tension of 1677
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**IT IS A PAYING INVESTMENT**
to carry an advertisement in the ELECTRIC RAILWAY JOURNAL every week in the year.

# *"Is it better practise to paint cross-arms than it is to treat them with wood-preservative?"*

THE above question is quoted from the "Question Box" of *Aera* for May, so also the following replies:

Barrett's
TRADE B MARK
Carbosota
Grade-One Liquid
Creosote Oil

*Answer from New York*—"Painting wooden cross-arms is entirely a waste of labor and material, unless it is necessary on account of appearance. It does not increase the life of the arm to any extent, as paint does not keep water and decay out of the arm. I think that treating with wood-preservative is cheaper and probably helps to increase the life of the arm to a considerable extent."

*Answer from Minnesota*—"We have only one lot of creosoted arms. They are in better condition than painted arms that were put up at the same time."

*Answer from Connecticut*—"It is getting to be very generally felt that a preventive treatment is very much better than a paint treatment of cross-arms. With a well-dried arm and a good grade of paint very good results can be had; but it has been found with many companies that in spite of all care, arms are often painted when green and the paint used is often of poor quality, so that any one of the several preservatives will better protect the green arm, and as a matter of fact is less liable to adulteration than the paint."

*Answer from California*—"Yes, considering benefits derived from each process in this locality."

*Answer from Ohio*—"It is better practise to treat cross-arms with wood-preservative than it is to paint."

*Answer from Texas*—"For the sake of the preservation of the timber it is better practise to treat cross-arms with a wood-preservative, and also to treat the cross-arm gains with the same preservative than it is to paint them. The objection to treating cross-arms with any wood-preservative is that it renders the wood somewhat of an electric conductor, and it is therefore more conducive to grounds and shocks than when the cross-arms are merely painted."

*Answer from Maine*—"We believe treating with * * * [wood-preservative] is preferred to painting."

*Answer from Colorado*—"Wood-preservative is better than paint on cross-arms. However, linemen object to cross-arms treated with the former."

*Out of eight answers only one is negative.*

Treatment of cross-arms with coal-tar creosote oil is beneficial, inexpensive and simple. They should be permitted to season thoroughly, as it is not advisable to treat green arms.

After treatment cross arms should be permitted to dry, and if that is done linemen will have no cause to "kick."

— — —

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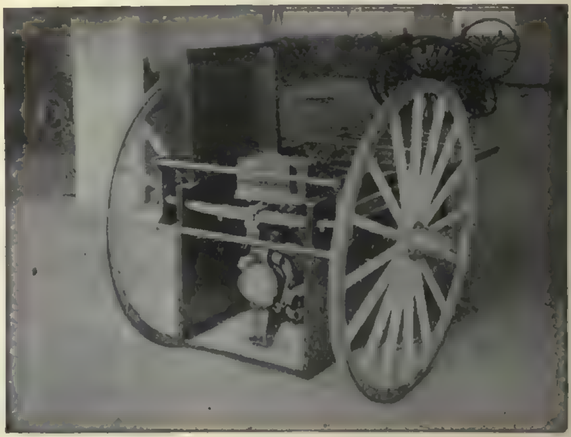

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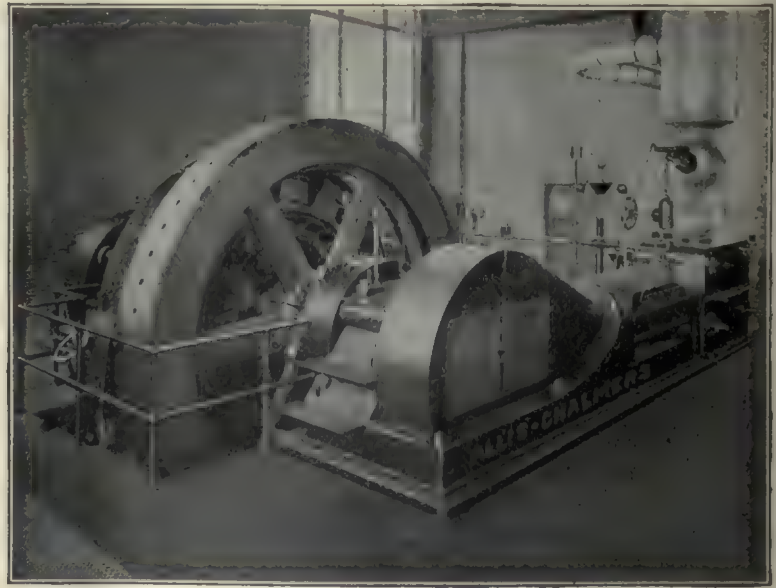

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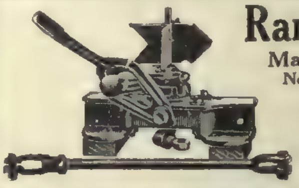

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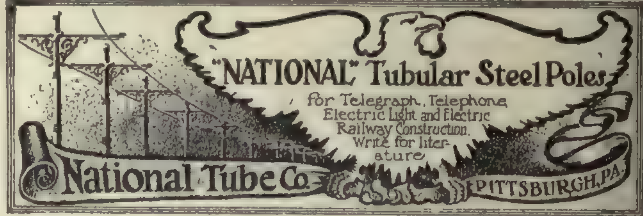
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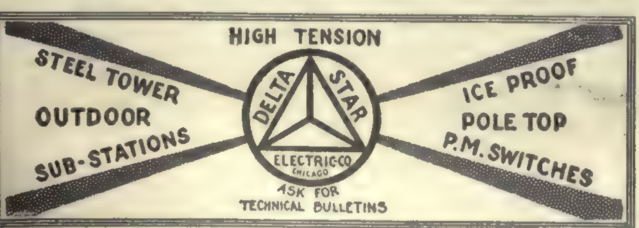

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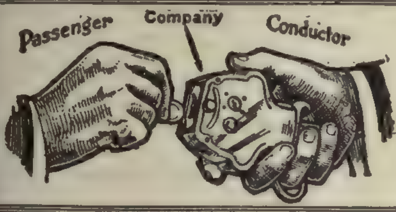

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Miles of service from the Brake Shoe are more to be desired than pounds of scrap.

All of which means increased efficiency and decreased cost of Brake Maintenance.

**American Brake Shoe & Foundry Co.**
**30 Church St., New York**
**McCormick Bldg., Chicago** **Chattanooga, Tenn.**

A decidedly important feature of "Light-Safety" cars is the

**Truck**

**Have you investigated the "St. Louis All Pressed" design? It will interest you.**

St. Louis
Car Company

The words "AMERICAN BRUSH SERVICE" represent high-grade material, first-class workmanship, quick deliveries and a guarantee of satisfaction.

AMERICAN CARBON & BATTERY WORKS E. ST. LOUIS, ILL.
OF NATIONAL CARBON CO., INC.

**"Boyerized" Products Reduce Maintenance**

Bemis Trucks
Case Hardened Brake Pins.
Case Hardened Bushings
Case Hardened Nuts and Bolts
Manganese Brake Heads
Manganese Transom Plates
Manganese Body Bushings
Bronze Axle Bearings

Bemis Pins are absolutely smooth and true in diameter. We carry 40 different sizes of case hardened pins in stock. Samples furnished. Write for full data.

**Bemis Car Truck Co., Springfield, Mass.**

VAN DORN COUPLERS

are made for every condition and requirement. M. C. B. Pin and Link, Car and Air, in all sizes and types.

**VAN DORN COUPLER CO.**
**2325 So. Pauling St., Chicago, Ill.**

**UNION SPRING & MFG. CO.**
**SPRINGS**
COIL AND ELLIPTIC
**M. C. B. Pressed Steel Journal Box Lids**
General Office: First Nat'l Bank Bldg.
PITTSBURGH, PA.
Works: New Kensington, Pa.
50 Church St., New York. 1204 Fisher Bldg., Chicago, Ill.
Missouri Trust Bldg., St. Louis, Mo.

**Samson Bell and Register Cord**

Solid braided cotton, extra quality. All sizes and colors. More durable, more economical and better looking than leather or rawhide. Send for samples and full information.

**SAMSON CORDAGE WORKS** **BOSTON, MASS.** 2

# SEARCHLIGHT SECTION

## FREQUENCY CHANGERS

4 1000 KW. SETS:
Generators: 3 ph., 60 cy., 4500-2300 volts, 300 RPM.
Motors: 1050 Kva., 3 ph., 25 cy., 6600 volts, 300 RPM.
Exciters: Direct connected.
Switchboards: With necessary instruments.

1 100 KW. SET:
Generator: Sgle. ph., 60 cycle, 2300 volts, 720 RPM.
Motor: 150 HP., 3 ph., 25 cy., 2300 volts, 720 RPM.
Exciter: 5 KW., direct connected.

## ROTARY CONVERTERS AND MOTOR GENERATOR SETS—25 Cycles

1 600 KW. Gen. Elec., TC-A, 3 ph., 600 volt, D.C., 375 volt A.C., 8 pole, 375 RPM.

1 1000 KW. set consisting of 1000 KW. 16 pole generator, 275 volts, 3636 amp., dir. conn. to 1050 KW. synchronous motor, 3 ph., 25 cy., 6600 volts, 250 RPM.

1 600 KW. set consisting of two 300 KW. 6 pole generators, 550 volts, 600 amps., dir. conn. to one 750 HP. synchronous motor, 3 ph., 25 cy., 6600 volt, 500 RPM., complete with AC and DC panels.

4 500 KW. Gen. Elec., HC-K, 600 volt D.C., 4 pole, 750 RPM., each rotary complete with three 165 Kva. Gen. Elec. OI SC Transformers, HP-RP, 6600/5940 volts prim., 430/286/143 volts sec., also necessary panels and instruments.

1 500 KW. Westg., 3 ph., 550 volt D.C., 390 volt A.C., 6 pole, 500 RPM., with dir. conn. starting motor AC and DC panels and three 175 KW. Westg. oil cooled transformers, 13,200 volts prim., 390 volts sec.

## ROTARY CONVERTERS—60 Cycles

1 300 KW. Westinghouse, 525-575 volts D.C., 600 RPM., with two 165 KW. Westg. oil insulated transformers, 2200 volts primary, 367 volts secondary.

2 300 KW. Gen. Elec., type HC, form P, 8 pole, 3 ph., 60 cy., 600 volts D.C., 900 RPM. With each rotary there are three 110 KW. Gen. Elec. AB form B1 transformers, 13,200 volts primary, 430 volts sec., also panels with necessary instruments.

*Our new and complete list of steam and electrical equipment will be mailed upon request*

**MACGOVERN & COMPANY, Inc.**
**114 Liberty Street, New York City**

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## FOR SALE

## MOTORS

4—W. H. 38-B **Motors,** complete with gears, pinions and gear casings.

12—W. H. 68 **Motors,** complete with gears, pinions and gear casings.

8—G. E. 80 **Motors,** complete with gears, pinions and gear casings.

90—G. E. 67 **Motors,** complete with gears, pinions and gear casings.

12—G. E. 73 **Motors,** complete with gears, pinions and gear casings.

## CONTROLLERS

12—W. H. K-6 **Controllers.** 20—K-11 **Controllers.**
30—K-10 **Controllers.** 10—K-28-B **Controllers.**

## COMPRESSORS

25—AA-1 Air **Compressors.**

## GEARS

51—Solid Gears, 68 teeth, 3⅞" rough bore, machined from Carnegie rolled steel blanks, standard hub, for W. H. 12-A, 68, 56 and 49 Motors. Can be bored for 4½" axle.

## LATHE

1—Pond Car Wheel **Lathe,** motor driven.

**For further particulars apply to**

**W. R. KERSCHNER COMPANY, INC.**
**50 Church Street, New York, N. Y.**

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## FOR SALE

8—Brill No. 21 Single Trucks.

8—250 hp. Stirling Boilers, equipped with Murphy Stokers.

151—Open Car Bodies, 31 equipped with Tomlinson Couplers, Storage Air Brakes, and Dupont Trucks.

Write for full particulars to

**Purchasing Dept.**
**DETROIT UNITED RY.**
**Detroit, Mich.**

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## IMMEDIATE SHIPMENT

1—500 KW. General Electric Curtis steam turbine, 3 ph., 60 cy., 1800 rpm., 2300 volts, 150 lb. steam pressure, vertical type.
1—500 K.W. Westinghouse Horizontal Turbo Generating Unit wound for 3 phase, 60 cycle, 2300 volts, speed 3600 rpm., condensing duty.

### 25 Cycle Rotary Converters

2—150 KW. General Electric type T.C., 4-150-750, 25 cycle, 3 ph., 575 volt, rotary converters, 750 rpm., complete with end play and speed limit device.

### 200 Kilowatt 60 Cycle Rotary Converters

1—200 KW. Westinghouse 3 ph., 60 cy. rotary converters, 550 volts, 720 rpm., complete with 4—100 KW. Westinghouse Scott connected oil insulated transformers, 10,000/9500 volts prim., 430/362 volts secy.
1—150 KW. Westinghouse 3 ph., 60 cy., rotary converter, 550 volts, 720 rpm.

### Transformers

6—750 KVA. General Electric oil filled self cooled transformers, 4400/281 volts, with 4400-4290-4180-4070-2200-2090-1980 taps in the primary.
3—500 KW. General Electric, 60 cy., single phase transformers, 66,000 volts primary, 4400/2200 volts secondary.
3—375 KVA. Allis Chalmers O. I. S. C. indoor type transformers, 25 cy., 2300 v., 367 v. secy.
3—350 KVA. General Electric, type H, 60 cy., transformers 2400/2300/2200 v. prim., 200/400 v. secy.
1—100 KVA. General Electric, type H, 60 cy. transformer, 4600 volts prim., 115-230 volts secy.
4—100 KW. Westinghouse, oil insulated, Scott connected transformers, 10,000/9500 v. prim., 430/362 v. secy.
3—75 KW. Westinghouse 60 cy. transformers, 2200 v. prim., 110/220/440 v. secy.
3—50 KVA. General Electric type H, 60 cy. transformers, 900/1000/16000 v. prim. Y., 230/460 v. secy.
Also a stock of smaller sized transformers.

**IMMEDIATE DELIVERY**

**ARCHER & BALDWIN, Inc.**
**114-118 Liberty Street New York City**
**TELEPHONE 4337-4338 RECTOR**

# SEARCHLIGHT SECTION

## *Get your Wants into the Searchlight*

### ADVERTISING RATES

Under "Positions Wanted," including Salesmen looking for new connections, Evening Work Wanted, etc., undisplayed advertisements cost **three cents a word,** minimum charge 50 cents an insertion, **payable in advance;** less 10% if one payment is made in advance for 4 continuous insertions.

Under "Positions Vacant," including Agents and Agencies Wanted, Representatives Wanted, Salesmen Wanted, Partners Wanted, Business Opportunities, Employment Agencies, and Miscellaneous For Sale, For Rent, and Want ads; also Auction Notices, Receivers' Sales, Machinery and Plants For Sale or Wanted, undisplayed advertisements set solid in one paragraph, cost **five cents a word,** minimum charge $1.50 an insertion.

Machinery advertisements (undisplayed) set with a paragraph for each item, or tabulated, 30 cents a line, minimum 5 lines.

If replies are in care of any of our offices, allow five words for the address.

All advertisements for bids (Proposals) cost $2.40 an inch.

**ADVERTISEMENTS IN DISPLAY TYPE**

cost as follows for single insertions:

| | | | |
|---|---|---|---|
| 1/16 p. (1⅛x3⅜ ins.) | $5.00 | 1 in. (1x2 1/16 ins.) | $3.00 |
| ⅛ p. (2⅜x3⅜ ins.) | 10.00 | 4 inches (4x2 1/16 ins.) | 11.60 |
| ¼ p. (5x3⅜ or 2⅜x7 ins.) | 20.00 | 8 inches (8x2 1/16 ins.) | 22.40 |
| ½ p. (10¼x3⅜ or 5x7 ins.) | 40.00 | 15 inches | 40.50 |

For space to be used within one year, to be divided to suit requirements of advertiser, provided some space is used at least once a month following first insertion:

| | | | |
|---|---|---|---|
| 1 page | $80 a page | 18 pages | $56 a page |
| 3 pages | 72 a page | 26 pages | 52 a page |
| 6 pages | 64 a page | 32 pages | 50 a page |
| 9 pages | 62 a page | 40 pages | 48 a page |
| 12 pages | 58 a page | 52 pages | 45 a page |

In replying to advertisements, do NOT enclose original testimonials, or anything that you may want returned. State your qualifications in as concise and neat a manner as you can and enclose COPIES of testimonials. In machinery ads, use a local name or address if possible so that readers can wire direct and get quick replies.

### MISCELLANEOUS WANTS

**Wanted at Once**

For immediate shipment any quantity of battery lead plates, sediment scrap copper and wire, brass and all other grades of scrap material. Write to us today for our prices. National Metal & Rubber Co., 31 India Wharf, Boston, Mass.

WANTED

**Motor Generator**

Motor, 3 phase, 60 cycles, Generator, 500 volts, direct current of about 200 K.W. capacity. (Ont.) M1578, Elec. Ry. Journal, N. Y. C.

### POSITIONS WANTED

AUDITOR, secretary or treasurer of interurban road; 15 years' experience; fully acquainted interstate commerce commission requirements; furnish excellent references and bond as required. (Ind.) PW1574, Elec. Ry. Journal, Chicago.

AVAILABLE: Married man, 12 years' experience as car cleaner, pitman, wireman, foreman and inspector. Some technical and office experience. Desires change. Best references. (Mass.) PW 1582, Elec. Ry. Journal, N. Y. C.

COPPER zone fare collection. I have successfully handled this system for three years, and can do the same for you. Get a specialist and anticipate your needs. (Conn.) PW1565, Elec. Ry. Journal, N. Y. C.

### POSITIONS WANTED

ELECTRICAL engineer, 10 years' mechanical and electrical, railway and power station experience, desires position in power or railway company. References. Technical graduate, age 31. Address (Mass.) PW1576, Elec. Ry. Journal, N. Y. C.

ENGINEER executive desires position as manager of public utility. Technical graduate, 15 years' experience engineering, operating and executive positions. Good record and references. P. W. 1555, (Ill.) Elec. Ry. Jour., Chicago.

EXECUTIVE position wanted with industrial or public utility company by graduate electrical engineer. Extensive railway, power and lighting experience and public utility valuations. Age 39. (N.Y.) PW1561, Elec. Ry. Journal, N. Y. C.

MAN, 45, with 25 years' accounting, traffic and operating experience, last 8 years' traffic and general manager small railroad, desires position with electric line. P. W., 1554 (Wis.), Elec. Ry. Journal, Chicago.

OPERATING man with fifteen years' successful experience along very economical lines open for engagement as manager or superintendent, steam or electric. (Cal.) PW1575, Elec. Ry. Journal, San Francisco.

SUPERINTENDENT — Electric railway construction or operating. 15 years' experience as superintendent of construction, 5 years superintendent of operation. High class references furnished (Ill.) PW1581, Elec. Ry. Journal, Chicago.

### POSITIONS WANTED

SUPERINTENDENT, who has come up through the ranks. Have been successful as trainman dispatcher, superintendent of transportation and overhead; 40 years of age, with present company 10 years. Desirous of making a change. (Ohio) PW1564, Elec. Ry. Journal, Cleveland.

### POSITIONS VACANT

ARMATURE winders. Permanent positions. Best working conditions. Address (Ind.) P1580, Elec. Ry. Journal, Cleveland.

MAN wanted for central station distribution system. Must be experienced in high and low tension overhead line construction. Give age, experience and salary expected. (Pa.) P1583, Elec. Ry. Journal, Philadelphia.

### EMPLOYMENT AGENCIES

**Correspondence Service**

The undersigned provides a confidential service designed to locate openings through correspondence for men earning not less than $2,500 and up to $25,000; all lines. Not an employment agency, but a constructive, initiative service, covering individual negotiations. Established 1910. Complete privacy assured; present connections in no way jeopardized. Send name and address only for explanatory details. R. W. Bixby, H1 Niagara Square, Buffalo, N. Y.

FOR SALE

1 GE 300-kw., 750-600-volt compound

**Rotary Converter**

3 H. R. 60-100-kw., 13200-370-volt, oil-cooled

**Transformers**

Complete with a.c. and d.c. switchboards.
Practically new; in daily operation.
Immediate delivery.

F. L. BUTLER, General Manager,
**Chicago & West Towns Railway Co.**
Oak Park, Illinois

**SCRAP**

**—SELL US ALL YOU HAVE**

Just now we particularly want copper-tin scrap, copper turnings, wrought brass turnings, composition turnings, railroad turnings.

**THE AJAX METAL COMPANY**
Established 1880

Main Office and Works
Philadelphia, Pa.

OFFICES
New York
Boston
St. Louis
Chicago
Washington
Pittsburgh

Southern Plant
Birmingham, Ala.
San Francisco
Detroit

AJAX
METAL COMPANY

## Engine Generator Sets

1—100 KW., 250 V. D.C. Steam Engine Generator Set.
1—17½ KW., 125 V. D.C. Gas Engine Generator Set.
1—62 KW., 500 V. D.C. Gas Engine Generator Set.
1—500 KW., 550 V. D.C. Generator belted to synchronous motor, 2200 V., 3 phase, 60 cycle.

## Direct Current Motors

1—½ HP., 1075 R.P.M., 550 V. Robbins & Myers.
1—5 HP., 550 V. C. & C.
1—10 HP., 1260 R.P.M., 500 Volts, D.C. Type CCM Crocker Wheeler.
1—10 HP., 1500 R.P.M., 550 V. Peerless.
1—15 HP., 1150 R.P.M., 500 V. Westinghouse Type "S."
1—40 HP., 550 R.P.M., 550 V. Westinghouse Type "S" compound wound.

DUQUESNE
New and Used Electrical Equipment
Electric & Mfg Co.

**Bessemer Building**
**Pittsburgh, Pa.**

**Marshall Building**
**Cleveland, Ohio**

---

## IMMEDIATE SHIPMENT

100 tons of 62 lb. Shanghai rails, together with bars, rails practically as good as new, ready for quick shipment.

Also one direct connected Ridgway Dynamo and Engine, 200 volt, 550 KW., as good as new. Wire for prices.

**M. K. FRANK**
**Frick Building, Pittsburgh, Pa.**

---

## 85 lb. A. S. C. E. Relayers

16,000 tons—with Angle Bars to match. Available immediate shipment and centrally located.
We positively own these Rails and offer same in carload lots and over.
25,000 tons—Relayers—sizes 25 lb. to 100 lb., in stock our Pittsburgh yards and vicinity.
Immediate shipment guaranteed and prices very attractive.
Carload and less than carload inquiries and orders solicited.
Rails cut to length for structural purposes.
Frogs, Switches, Bolts, Nuts, Spikes and all Accessories.

L. B. FOSTER COMPANY
Park Bldg. Pittsburgh, Pa.

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CLEVELAND ARMATURE WORKS

Cleveland, Ohio

## Everything in the Line of Repairs to Electrical Machinery

Complete Armatures, New Armatures, Rewound Armature Cores, Armature Shafts, Armature Coils, Fields and Commutators.

Established 22 Years.

---

## CAR BARGAINS

OPEN and CLOSED
MOTOR and TRAIL

*Write for Price and Full Particulars to*

ELECTRIC EQUIPMENT Co.
601 Commonwealth. Bldg Phila Pa

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# APPARATUS FOR SALE

1 Galvanized Iron **Exhaust Head,** for 30-in. pipe. Flange dia. 36½ in. Dia. at top. 72 in. Height over all, 118 in.

1 (Practically new) 5-in. "Janesville" two-stage **Turbine Centrifugal Pump,** with extended base for motor, flexible coupling and brass impellers. Capacity 600 gal. per minute.

1 "Quimby" **Screw Pump,** 5-in. suction, 4-in. discharge from Valve Hood.

1 60 H.P. **Motor,** set on a base with a No. 5 "Quimby" Pump. Manufactured by Otis Elevator Co. No. A3988. Amp. 90. Volts 500. R.P.M. 775. With or without pump.

1 3-ton Jeffrey Electric **Locomotive,** 500 volt, D.C., Starting Draw Bar Pull, 1500 to 2000 lb. Track Gauge 24 in.

5 No. 14 30-cu.ft. Side Gate **Concrete Cars.**

1 36-cu.ft. End Dumping **Concrete Car.**

1450 ft. **Track,** 16-lb. Rail.

10 **Switches,** for use with above track.

1 Double **Crossover,** for use with above track.

2 Insley Self-Pumping **Buckets,** 27-ft. capacity. No. 227, complete.

1 27-ft. **Concrete Measuring Car,** complete, 4 wheels (special).

1 No. 40 Ransome **Concrete Mixer,** mounted on skids with fixed Batch Hopper.

1 Portable **Air Compressor Outfit,** mounted on steel trucks, consisting of Ingersoll-Rand Class E Compressor, 8x8 in. at 150 R.P.M. free air per min., 69 cu. ft. air pressure, designed for 50-100 lb., 9 to 13 H.P. to operate Compressor, "Abenaque" Engine, 15 H.P., 275 R.P.M., horizontal and cycle type.

1 Vertical **Milling Machine,** approx. weight 10,000 lb., belt-driven, 36-in. round, movable table on sliding base, vertical traveling head, 4 step cone.

1 ft. Power **Drop Hammer,** approx. weight 500 lb., height of drop 45 in., weight of drop about 70 lb.

1 **Planer,** 2 ft. 6 in. x 2 ft. 6 in. x 8 ft. single head. Make, Lucius W. Pond, Worcester, Mass., weight about 5000 lb.

1 **Blower,** about 26-in. fan, 10x13 in. outlet, 8x6¼ in. pulley. Weight approx. 200 lb.

1000 lb. New 2-in. Octagon **Tool Steel,** John Illingworth Steel Co.'s make.

2 Cavicchi No. 1 Pneumatic **Stone Polishing Machines,** each complete with 2 sets of arms.

1 12-in. **Bellow,** 9—10-in., 4—8-in., 5—4-in. and 6—5-in. **Scrolls** for Stone Polishing Machines.

1 Style A-10 Jaynesville **Bar Shear** (hand), cut ⅝x5-in. and 1¼-in. round steel bars, weight about 700 lb.

2918 ft. 25-lb. **Tee Rail,** 3 switches, 2 frogs.

*For further particulars apply to*

**Purchasing Agent, Boston Elevated Ry. Co., 101 Milk St., Boston, Mass.**

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## IMMEDIATE SHIPMENT

1—300 K.W. Westinghouse, compound wound, 3 bearing, belt-driven

## Generator

speed 435 R.P.M., 550 volts.

**LEO A. PHILLIPS**
Steam & Electrical Equipment
90 West Street New York City

---

FOR SALE

## Overhead Steel Bridge

Skew 63° 8'. Designed for two 60-ton Interurban cars. Main span of two through plate girders 53 feet long supported on four channel columns. Approaches of four 24" 80-lb. I-beams, average length 29 ft. 6 in. Will sell entire bridge or any separate member.

**Indiana Railways & Light Company**
Kokomo, Indiana.

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FOR SALE

Four, 65 H.P., Type 302, Allis-Chalmers.

## Railway Motors

NEW—HAVE NEVER BEEN USED with Gears, Pinions, Cases, Axle Bearings, Etc.

ALSO

## Two Passenger Trail Cars

In Fine Condition, Used Very Little, Seating Capacity 50, Completely Equipped.

QUICK SHIPMENT.

**The Arkansas Valley Int. Ry.**
**Wichita, Kan.**

---

FOR SALE

## Three Cars and Motor

We have for immediate delivery 3 8-bench single truck, open cars in good condition, equipped with G.E. 800 motors, Form K controllers; also registers, gauge 4 ft. 8½ in. Price $500 each f.o.b. Charlottesville, Va.

We also have one 7½ hp., 1500 r.p.m., 550-v, General Electric, D.C. motor, with starter, base and pulley, like new. Price $100.

**Charlottesville & Albemarle Ry. Co.**
**Charlottesville, Va.**

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## RAILS

**SHANGHAI**
500 ton 6-in. 60 lb. Relay. Good.

**GIRDER RAIL**
38 ton 7 in. 114 lb. Grooved Girder. New

**NEW WITH ANGLES**
200 ton 55 lb. A S CE.
1500 ton 60 lb. A S CE. Good as new.

| | |
|---|---|
| 230 ton 67 lb. | 134 ton 90 lb. new |
| 2000 ton 67½ lb. | 335 ton 94 lb. |
| 62 ton 85 lb. new | 650 ton 100 lb. |

If what you want is not listed here, write or wire us.

**Machinery Cars Equipment**

**ZELNICKER IN ST. LOUIS**

*Have you seen our new Bargain Bulletin?*

---

FOR SALE

## Westinghouse Air Brake Parts

Four ½-in. P. V. brake valves, four gauges registering from 10 to 100 pounds (⅜-in. pipe), four 20-in. x 48-in. air tanks. Also three Westinghouse air connecting couplers, complete. All practically new.

**K. C. KAW VALLEY & W. RY. CO.**
**Bonner Springs, Kan.**

# WHAT AND WHERE TO BUY

## Equipment, Apparatus and Supplies Used by the Electric Railway Industry with Names of Manufacturers and Distributors

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**Air Cleaners and Rectifiers.**
Horne Mfg. Co.

**Alloys, Steel and Iron. (See also Bearings and Bearing Metals.)**
Titanium Alloy Mfg. Co.

**Anchors, Guy.**
Electric Service Supplies Co.
Holden & White, Inc.
Ohio Brass Co.
Western Electric Co.
Westinghouse Elec. & M. Co.

**Anti-Climbers.**
Railway Improvement Co.

**Automobiles and Buses.**
Brill Co., The J. G.

**Axle Straighteners.**
Columbia M. W. & M. I. Co.

**Axles, Car Wheel.**
Bemis Car Truck Co.
Brill Co., The J. G.
Carnegie Steel Co.
National Tube Co.
St. Louis Car Co.
Standard Steel Works Co.
Westinghouse Elec. & M. Co.

**Babbitting Devices.**
Columbia M. W. & M. I. Co.

**Badges and Buttons.**
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International Register Co., The
Western Electric Co.

**Bankers and Brokers.**
National City Co.

**Batteries, Dry.**
Western Electric Co.

**Batteries, Storage.**
Electric Storage Battery Co.
Western Electric Co.

**Bearings & Bearing Metals.**
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Columbia M. W. & M. I. Co.
Eureka Co.
General Electric Co.
Kerschner Co., Inc., W. R.
Long Co., E. G.
St. Louis Car Co.
Westinghouse Elec. & M. Co.

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Baldwin Locomotive Works.
Holden & White, Inc.

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Gurney Ball-Bearing Co.
Railway Roller Bearing Co.

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Brill Co., The J. G.
Columbia M. W. & M. I. Co.
Electric Service Supplies Co.
St. Louis Car Co.
Western Electric Co.

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Niles-Bement-Pond Co.
Western Electric Co.
Zelnicker Sup. Co., W. A.

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**Boiler Cleaning Compounds.**
Dearborn Chemical Co.

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American Steel & Wire Co.

**Bonding Apparatus.**
American Steel & Wire Co.
Electric Railway Improvement Co.
Electric Service Supplies Co.
Ohio Brass Co.

**Bonds, Rail.**
American Steel & Wire Co.
Electric Railway Improvement Co.
Electric Service Supplies Co.
General Electric Co.
Lincoln Bonding Co.
Ohio Brass Co.
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McGraw-Hill Book Co., Inc.

**Boring Tools, Car Wheel.**
Niles-Bement-Pond Co.

**Braces, Rail.**
Kilby Frog & Switch Co.

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Hubbard & Co.
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St. Louis Car Co.

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Bemis Car Truck Co.
Brill Co., The J. G.
Columbia M. W. & M. I. Co.
General Electric Co.
Holden & White, Inc.
Horne Mfg. Co.
Long Co., E. G.
St. Louis Car Co.
Westinghouse Trac. B. Co.

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Zelnicker Supply Co., W. A.

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**Brushes, Carbon.**
American Carbon & Battery Co.
General Electric Co.
Jeandron, W. J.
Morgan Crucible Co.
Western Electric Co.
Westinghouse Elec. & M. Co.

**Brushes, Graphite.**
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**Bushings, Case Hardened and Manganese.**
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**Bushings, Fibre.**
Diamond State Fibre Co.

**Cables. (See Wires and Cables.)**

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**Car Equipment. (For Fenders, Heaters, Registers, Wheels, etc.—See those headings.)**

**Car Trimmings. (For Curtains, Registers, Doors, Seats, etc. — See those headings.)**

**Cars, Passenger, Freight, Express, etc.**
American Car Co.
Brill Co., The J. G.
Jewett Car Co.
Kuhlman Car Co., G. C.
St. Louis Car Co.
Stephenson Co., John
Wason Mfg. Co.

**Cars, Second Hand.**
Electric Equipment Co.
Kerschner Co., Inc., W. R.

**Cars, Self-Propelled.**
Electric Storage Battery Co.
General Electric Co.

**Castings, Brass, Composition or Copper.**
Anderson Mfg. Co., A. & J. M.
Columbia M. W. & M. I. Co.
Eureka Co.
Frankel Connector Co.
Horne Mfg. Co.

**Castings, Gray Iron and Steel.**
Amer. Brake Shoe & Fdry. Co.
Bemis Car Truck Co.
Columbia M. W. & M. I. Co.
Horne Mfg. Co.
Long Co., E. G.
St. Louis Car Co.
Standard Steel Works Co.
Union Spring & Mfg. Co.

**Castings, Malleable and Brass.**
Amer. Brake Shoe & Fdry. Co.
Bemis Car Truck Co.
Columbia M. W. & M. I. Co.
Horne Mfg. Co.
Long Co., E. G.
St. Louis Car Co.

**Catchers and Retrievers, Trolley.**
Electric Service Supplies Co.
Holden & White, Inc.
Horne Mfg. Co.
Kerschner Co., Inc., W. R.
Long Co., E. G.
Ohio Brass Co.
Wood Co., Chas. N.

**Ceiling, Car.—(See Head Lining.)**

**Chemists.**
Little, Inc., Arthur D.

**Circuit Breakers.**
Cutter Electrical & Mfg. Co.
General Electric Co.
Western Electric Co.
Westinghouse Elec. & M. Co.

**Clamps and Connectors for Wires and Cables.**
Anderson Mfg. Co., A. & J. M.
Electric Service Supplies Co.
Frankel Connector Co.
General Electric Co.
Hubbard & Co.
Klein & Sons, Mathias.
Ohio Brass Co.
Western Electric Co.
Westinghouse Elec. & M. Co.

**Cleaners and Scrapers, Track.—(See also Snow-Plows, Sweepers and Brooms.)**
Brill Co., The J. G.
Ohio Brass Co.
Western Electric Co.

**Clusters and Sockets.**
General Electric Co.

**Coal and Ash Handling.—(See Conveying and Hoisting Machinery.)**

**Coasting Recorders.**
Railway Improvement Co.

**Coil Banding and Winding Machines.**
Columbia M. W. & M. I. Co.
Electric Service Supplies Co.
Western Electric Co.

**Coils, Armature and Field.**
Cleveland Armature Works
Columbia M. W. & M. I. Co.
D & W Fuse Co.
General Electric Co.
Independent Lamp & Wire Co.
Westinghouse Elec. & M. Co.

**Coils, Choke and Kicking.**
Electric Service Supplies Co.
General Electric Co.
Westinghouse Elec. & M. Co.

**Coin-Counting Machines.**
International Register Co., The

**Commutator Slotters.**
Electric Service Supplies Co.
General Electric Co.
Westinghouse Elec. & M. Co.
Wood Co., Chas. N.

**Commutator Truing Devices.**
General Electric Co.

**Commutators or Parts.**
Cleveland Armature Works
Columbia M. W. & M. I. Co.
Eureka Co.
General Electric Co.
Long Co., E. G.
Western Electric Co.
Westinghouse Elec. & M. Co.

**Compressors, Air.**
Allis-Chalmers Mfg. Co.
General Electric Co.
Westinghouse Trac. B. Co.

**Condensers.**
Allis-Chalmers Mfg. Co.
General Electric Co.
Westinghouse Elec. & M. Co.

**Conduits.**
Western Electric Co.

**Connectors, Solderless.**
Frankel Connector Co.
Horne Mfg. Co.

**Controller Regulators.**
Electric Service Supplies Co.

**Controllers or Parts.**
Allis-Chalmers Mfg. Co.
Columbia M. W. & M. I. Co.
Electric Service Supplies Co.
General Electric Co.
Horne Mfg. Co.
Kerschner Co., Inc., W. R.
Westinghouse Elec. & M. Co.

**Controlling Systems.**
General Electric Co.
Westinghouse Elec. & M. Co.

**Converters, Rotary.**
Allis-Chalmers Mfg. Co.
General Electric Co.
Western Electric Co.
Westinghouse Elec. & M. Co.

**Conveying and Hoisting Machinery.**
Columbia M. W. & M. I. Co.
Green Engrg. Co.

**Cord, Bell, Trolley, Register, etc.**
Brill Co., The J. G.
Electric Service Supplies Co.
International Register Co., The
Long Co., E. G.
Roebling's Sons Co., John A.
Samson Cordage Works

**Cord Connectors and Couplers.**
Electric Service Supplies Co.
Samson Cordage Works
Wood Co., Chas. N.

**Couplers, Car.**
Brill Co., The J. G.
Long Co., E. G.
Ohio Brass Co.
Van Dorn Coupler Co.
Westinghouse Trac. B. Co.

**Couplings, Conduit.**
Horne Mfg. Co.

**Cranes.—(See also Hoists.)**
Allis-Chalmers Mfg. Co.
Niles-Bement-Pond Co.

**Creosoting. (See Wood Preservatives.)**

**Cross Arms. (See Brackets.)**

**Crossing Foundations.**
International Steel Tie Co.

**Crossing Signals. (See Signals, Crossing.)**

**Crossings, Track. (See Track, Special Work.)**

**Crushers, Rock**
Allis-Chalmers Mfg. Co.

Model 370—A.C. and D.C. Ammeter

One of the Portable Electrodynamometer Group, which also includes Model 310 Single Phase and D.C. Wattmeter, Model 329 Polyphase Wattmeter and Model 341 A.C. and D.C. Voltmeter.

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have played a leading, often an indispensable, part in the advances made since 1888 in every field of electrical achievement. Today, as at every previous stage of their steady progress toward perfection, they stand alone as the highest attainment in the art of Electrical Measurement.

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Holden & White

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Eastern Agents for Union Fibre Co.

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What's the usual result of an overload on your car motors or compressors?

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# WHAT AND WHERE TO BUY

**Culverts.**
Canton Culvert & Silo Co.

**Curtains and Curtain Fixtures.**
Brill Co., The J. G.
Electric Service Supplies Co.
Hartshorn Company, Stewart
Pantasote Co., The
St. Louis Car Co.

**Derailing Devices. (See also Track Work.)**
Cleveland Frog & Crossing Co.

**Destination Signs.**
Columbia M. W. & M. I. Co.
Electric Service Supplies Co.

**Detective Service.**
Wisch Service, P. Edward

**Dispatching Systems.**
Simmen Automatic Ry. Sig. Co.
Western Electric Co.

**Door Operating Devices.**
Consolidated Car Heating Co.

**Doors and Door Fixtures.**
Brill Co., The J. G.
General Electric Co.
Hale & Kilburn Co.

**Doors & Shutters, Fireproof.**
Kinnear Mfg. Co.

**Doors, Steel Rolling.**
Kinnear Mfg. Co.

**Draft Rigging. (See Couplers.)**

**Drills, Track.**
American Steel & Wire Co.
Electric Service Supplies Co.
Long Co., E. G.
Niles-Bement-Pond Co.
Ohio Brass Co.

**Dryers, Sand.**
Electric Service Supplies Co.
Zelnicker Sup. Co., W. A.

**Engineers, Consulting, Contracting and Operating.**
Archbold-Brady Co.
Arnold Co., The
Beeler, John A.
Byllesby & Co., Inc., H. M.
Drum & Co., A. L.
Ford, Bacon & Davis
Hunt & Co., Robert W.
Jackson, D. C. & Wm. B.
Little, Inc., Arthur D.
Richey, Albert S.
Sanderson & Porter
Scofield Engineering Co.
Stone & Webster Eng. Corp.
White Companies, J. G.
Woodmansee & Davidson, Inc.

**Engines, Gas and Oil.**
Allis-Chalmers Mfg. Co.
Westinghouse Elec. & M. Co.

**Engines, Steam.**
Allis-Chalmers Mfg. Co.
Westinghouse Elec. & M. Co.

**Fare Boxes.**
Brill Co., The J. G.
International Register Co., The

**Fences, Woven Wire and Fence Posts.**
American Steel & Wire Co.
Page Woven Wire Fence Co.

**Fenders and Wheel Guards.**
Brill Co., The J. G.
Consolidated Car Fender Co.
Electric Service Supplies Co.
Horne Mfg. Co.
Star Brass Works
Western Electric Co.

**Fibre Insulation.**
National Ry. Appliance Co.

**Fibre and Fibre Tubing.**
Diamond State Fibre Co.
Westinghouse Elec. & M. Co.

**Field Coils. (See Coils.)**

**Flooring Composition.**
American Mason Safety Tread Co.
Western Electric Co.

**Forgings.**
Eureka Co.
Standard Steel Works Co.

**Frogs, Track. (See Track Work.)**

**Furnaces. (See Stokers.)**

**Fuses and Fuse Boxes.**
Columbia M. W. & M. I. Co.
D & W Fuse Co.
Daum, A. F.
General Electric Co.
Western Electric Co.
Westinghouse Elec. & M. Co.

**Fuses, Refillable.**
Columbia M. W. & M. I. Co.
General Electric Co.
Horne Mfg. Co.

**Gaskets.**
Diamond State Fibre Co.
Power Specialty Co.

**Gas Producers.**
Westinghouse Elec. & M. Co.

**Gates, Car.**
Brill Co., The J. G.
Jewett Car Co.

**Gages, Oil and Water.**
Ohio Brass Co.

**Gear Blanks.**
Carnegie Steel Co.
Diamond State Fibre Co.
Standard Steel Works Co.

**Gear Cases.**
Columbia M. W. & M. I. Co.
Electric Service Supplies Co.
Kerschner Co., Inc., W. R.
National Ry. Appliance Co.
Westinghouse Elec. & M. Co.

**Gears and Pinions.**
Columbia M. W. & M. I. Co.
Diamond State Fibre Co.
Electric Service Supplies Co.
General Electric Co.
Kerschner Co., Inc., W. R.
Long Co., E. G.
National Ry. Appliance Co.
Nuttall Co., R. D.

**Generating Sets, Gas-Electric.**
General Electric Co.

**Generators.**
General Electric Co.
Lincoln Electric Co.
Western Electric Co.
Westinghouse Elec. & M. Co.

**Gongs. (See Bells and Gongs.)**

**Graphite.**
Dixon Crucible Co., Joseph
Morgan Crucible Co.

**Greases. (See Lubricants.)**

**Grinders and Grinding Supplies.**
General Electric Co.
Goldschmidt Thermit Co.
Railway Track-work Co.
Western Electric Co.

**Guards, Trolley.**
Electric Service Supplies Co.
Ohio Brass Co.

**Harps, Trolley.**
Anderson M. Co., A. & J. M.
Electric Service Supplies Co.
Nuttall Co., R. D.
Star Brass Works.
Western Electric Co.

**Headlights.**
Electric Service Supplies Co.
General Electric Co.
Kerschner Co., Inc., W. R.
Long Co., E. G.
Ohio Brass Co.
St. Louis Car Co.
Westinghouse Elec. & M. Co.

**Headlining.**
Kerschner Co., Inc., W. R.
Pantasote Co., The.

**Heaters, Car (Electric).**
Consolidated Car Heating Co.
Gold Car Heating & Lighting Co.
Smith Heater Co., Peter.

**Heaters, Car, Hot Air and Water.**
Cooper Heater Co.
Smith Heater Co., Peter.

**Heaters, Car (Stove).**
Electric Service Supplies Co.
Smith Heater Co., Peter.

**Hoists and Lifts.**
Columbia M. W. & M. I. Co.
Duff Mfg. Co.
Ford Chain Block & Mfg. Co.
Niles-Bement-Pond Co.

**Hose, Bridges.**
Ohio Brass Co.

**Hydraulic Machinery.**
Niles-Bement-Pond Co.

**Hydrogrounds.**
Horne Mfg. Co.

**Inspection.**
Electrical Testing Lab's.
Hunt & Co., Robt. W.

**Instruments, Measuring, Testing and Recording.**
General Electric Co.
Sangamo Electric Co.
Western Electric Co.
Westinghouse Elec. & M. Co.
Weston Elec'l Instrument Co.

**Insulating Cloth, Paper and Tape.**
Diamond State Fibre Co.
General Electric Co.
Packard Electric Co.
Sherwin-Williams Co.
Standard Woven Fabric Co.
Western Electric Co.
Westinghouse Elec. & M. Co.

**Insulations. (See also Paints.)**
Anderson M. Co., A. & J. M.
Diamond State Fibre Co.
Electric Service Supplies Co.
General Electric Co.
Holden & White, Inc.
Sherwin-Williams Co.
Western Electric Co.
Westinghouse Elec. & M. Co.

**Insulators. (See also Line Material.)**
Anderson M. Co., A. & J. M.
Electric Service Supplies Co.
General Electric Co.
Ohio Brass Co.
Western Electric Co.
Westinghouse Elec. & M. Co.

**Insulator Pins.**
Hubbard & Co.

**Jacks. (See also Cranes, Hoists and Lifts.)**
Brill Co., The J. G.
Buckeye Jack Mfg. Co.
Columbia M. W. & M. I. Co.
Duff Manufacturing Co.
National Ry. Appliance Co.

**Joints, Rail.**
Atlantic Welding Co.
Carnegie Steel Co.
Lackawanna Steel Co.
Zelnicker Sup. Co., W. A.

**Journal Boxes.**
Bemis Car Truck Co.
Brill Co., The J. G.
Long Co., E. G.
Railway Roller Bearing Co.

**Laboratory.**
Electric Testing Lab's.
Little, Inc., Arthur D.

**Lamp Guards and Fixtures.**
Anderson M. Co., A. & J. M.
Electric Service Supplies Co.
General Electric Co.
Westinghouse Elec. & M. Co.

**Lamps, Arc and Incandescent. (See also Headlights.)**
Anderson M. Co., A. & J. M.
General Electric Co.
Western Electric Co.
Westinghouse Elec. & M. Co.

**Lamps, Signal and Marker.**
Ohio Brass Co.

**Lathes, Car Wheel.**
Niles-Bement-Pond Co.

**Lighting Regulators, Car.**
Holden & White, Inc.

**Lightning Protection.**
Anderson M. Co., A. & J. M.
Electric Service Supplies Co.
General Electric Co.
Horne Mfg. Co.
Ohio Brass Co.
Western Electric Co.
Westinghouse Elec. & M. Co.

**Line Material. (See also Brackets, Insulators, Wires, etc.)**
Anderson M. Co., A. & J. M.
Columbia M. W. & M. I. Co.
Diamond State Fibre Co.
Electric Service Supplies Co.
Eureka Co.
General Electric Co.
Holden & White, Inc.
Hubbard & Co.
Ohio Brass Co.
Western Electric Co.
Westinghouse Elec. & M. Co.

**Locomotives, Electric.**
Baldwin Locomotive Works.
Brill Co., The J. G.
General Electric Co.
Westinghouse Elec. & M. Co.

**Lubricating Engines.**
Galena-Signal Oil Co.

**Lubricants, Oil and Grease.**
Dearborn Chemical Co.
Dixon Crucible Co., Jos.
Galena-Signal Oil Co.

**Lumber. (See Poles, Ties, etc.)**

**Machine Tools.**
Columbia M. W. & M. I. Co.
Niles-Bement-Pond Co.

**Machine Work.**
Columbia M. W. & M. I. Co.
Horne Mfg. Co.

**Meters. (See Instruments.)**

**Meters, Car, Watt-Hour.**
Sangamo Electric Co.

**Mica.**
Long Co., E. G.

**Motormen's Seats.**
Electric Service Supplies Co.
Wood Co., Chas. N.

**Motors, Electric.**
General Electric Co.
Lincoln Electric Co.
Western Electric Co.
Westinghouse Elec. & M. Co.

**Motor Generation, Bonding and Welding.**
Lincoln Bonding Co.

**Nuts and Bolts.**
Bemis Car Truck Co.
Columbia M. W. & M. I. Co.
Hubbard & Co.
Lackawanna Steel Co.
Long Co., E. G.
National Railway Appliance Co.

**Oils. (See Lubricants.)**

**Oxy-Acetylene. (See Cutting Apparatus, Oxy-Acetylene.)**

**Packing.**
Diamond State Fibre Co.
Electric Service Supplies Co.
Horne Mfg. Co.
Power Specialty Co.

**Paints and Varnishes. (Insulating.)**
General Electric Co.
Long Co., E. G.
Packard Electric Co.
Sherwin-Williams Co.

**E. G. Long Company**

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53-TT

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# WHAT AND WHERE TO BUY

**Paints and Varnishes. (Preservative.)**
Dixon Crucible Co., Jos.
Long Co., E. G.
National Ry. Appliance Co.
Sherwin-Williams Co.

**Paints and Varnishes for Woodwork.**
National Ry. Appliance Co.
Sherwin-Williams Co.

**Paving Bricks, Filler and Stretcher.**
Nelsonville Brick Co.

**Paving Material.**
Am. Brake Shoe & Fdy. Co.
Barrett Co., The.
Nelsonville Brick Co.

**Paving Pitch.**
Barrett Co., The.

**Pickups, Trolley Wire.**
Electric Service Supplies Co.
Ohio Brass Co.

**Pinion Pullers.**
Columbia M. W. & M. I. Co.
Electric Service Supplies Co.
General Electric Co.
Wood Co., Chas. N.

**Pinions. (See Gears.)**

**Pins, Case Hardened, Wood and Iron.**
Bemis Car Truck Co.
Electric Service Supplies Co.
Long Co., E. G.
Ohio Brass Co.

**Pipe.**
National Tube Co.

**Pipe Fittings.**
National Tube Co.
Power Specialty Co.
Standard Steel Works Co.

**Planers. (See Machine Tools.)**

**Pole Reinforcing.**
Hubbard & Co.

**Poles and Ties, Treated.**
Lindsley Bros. Co.
Western Electric Co.

**Poles, Metal Street.**
Bates Expanded Steel Truss Co.
Hubbard & Co.
National Tube Co.

**Poles, Ties, Posts, Piling and Lumber.**
Carney & Co., B. J.
Lindsley Bros. Co.
Western Electric Co.

**Poles, Trolley.**
Anderson M. Co., A. & J. M.
Columbia M. W. & M. I. Co.
Electric Service Supplies Co.
Long Co., E. G.
National Tube Co.
Nuttall Co., R. D.

**Power Saving Devices.**
Arthur Power-Saving Recorder Co.
Railway Improvement Co.

**Pressure Regulators.**
General Electric Co.
Ohio Brass Co.

**Punches, Ticket.**
Bonney-Vehslage Tool Co.
International Register Co., The.
Wood Co., Chas. N.

**Rail Grinders. (See Grinders.)**

**Rail Welding. (See Brazing and Welding Processes.)**

**Rails, Relaying.**
Zelnicker Supply Co., W. A.

**Rattan.**
Brill Co., The J. G.
Electric Service Supplies Co.
Hale & Kilburn Co.
Jewett Car Co.
St. Louis Car Co.

**Recorders, Power Saving.**
Arthur Power-Saving Recorder Co.

**Registers and Fittings.**
Bonham Recorder Co.
Brill Co., The J. G.
Electric Service Supplies Co.
International Register Co., The.
Long Co., E. G.
Rooke Automatic Register Co.

**Reinforcement, Concrete.**
American Steel & Wire Co.

**Repair Shop Appliances. (See also Coil Banding and Winding Machines.)**
Columbia M. W. & M. I. Co.
Electric Service Supplies Co.

**Repair Work. (See also Coils.)**
Cleveland Armature Works.
Columbia M. W. & M. I. Co.
General Electric Co.
Independent Lamp & Wire Co.
Westinghouse Elec. & M. Co.

**Replacers, Car.**
Columbia M. W. & M. I. Co.
Electric Service Supplies Co.

**Resistance, Grid.**
Columbia M. W. & M. I. Co.

**Resistance, Wire and Tube.**
General Electric Co.
Western Electric Co.
Westinghouse Elec. & M. Co.

**Retrievers, Trolley. (See Catchers and Retrievers, Trolley.)**

**Rheostats.**
General Electric Co.
Westinghouse Elec. & M. Co.

**Roofing, Building.**
Barrett Co., The.

**Roofing, Car.**
Pantasote Co., The.

**Sand Blasts.**
National Ry. Appliance Co.

**Sanders, Track.**
Brill Co., The J. G.
Columbia M. W. & M. I. Co.
Electric Service Supplies Co.
Horne Mfg. Co.
Holden & White, Inc.
Jewett Car Co.
Ohio Brass Co.
St. Louis Car Co.

**Sash Fixtures, Car.**
Brill Co., The J. G.

**Sash Metal, Car Window.**
Hale & Kilburn Co.

**Scales, Weights, Balances and Dynamometers.**
Horne Mfg. Co.

**Scrapers, Track. (See Cleaners and Scrapers, Track.)**

**Seating Material. (See also Rattan.)**
Pantasote Co., The.

**Seats, Car.**
Brill Co., The J. G.
Hale & Kilburn Co.
Jewett Car Co.
St. Louis Car Co.

**Second-Hand Equipment. (See also pages 41-43.)**
Archer & Baldwin.
Kerschner Co., Inc., W. R.
MacGovern & Co., Inc.

**Shade Rollers.**
Hartshorn Co., Stewart.

**Shades, Vestibule.**
Brill Co., The J. G.
Electric Service Supplies Co.

**Shovels.**
Hubbard & Co.

**Signal Systems, Block.**
Electric Service Supplies Co.
Federal Signal Co.
Nachod Signal Co., Inc.
Simmen Automatic Railway Signal Co.
Western Electric Co.
Wood Co., Chas. N.

**Signals, Car Starting.**
Consolidated Car Heating Co.

**Signals, Highway Crossing.**
Electric Service Supplies Co.
Nachod Signal Co., Inc.

**Slack Adjusters. (See Brake Adjusters.)**

**Sleet Wheels and Cutters.**
Anderson Mfg. Co., A. & J. M.
Bonney-Vehslage Tool Co.
Columbia M. W. & M. I. Co.
Holden & White, Inc.
Nuttall Co., R. D.

**Snow-Plows, Sweepers and Brooms.**
Brill Co., The J. G.
Columbia M. W. & M. I. Co.
Consolidated Car Fender Co.

**Soaps.**
Sherwin-Williams Co.

**Soldering and Brazing Apparatus. (See Welding, Processes and Apparatus.)**

**Spikes.**
American Steel & Wire Co.
Lackawanna Steel Co.

**Splicing Compounds.**
Standard Woven Fabric Co.
Westinghouse Elec. & M. Co.

**Splicing Sleeves. (See Clamps and Connectors.)**

**Springs, Car & Truck.**
American Steel & Wire Co.
Bemis Car Truck Co.
Brill Co., The J. G.
Long Co., E. G.
Standard Steel Works Co.
Union Spring & Mfg. Co.

**Sprinklers, Track & Road.**
Brill Co., The J. G.
St. Louis Car Co.

**Steps, Car.**
American Mason S. T. Co.
Universal Safety Tread Co.

**Stokers, Mechanical.**
Babcock & Wilcox Co.
Green Engrg. Co.
Murphy Iron Works.
Westinghouse Elec. & M. Co.

**Storage Batteries. (See Batteries, Storage.)**

**Straps, Car, Sanitary.**
Holden & White, Inc.
Railway Improvement Co.

**Structural Iron. (See Bridges.)**

**Sub Stations.**
Delta Star Electric Co.

**Superheaters.**
Babcock & Wilcox Co.
Power Specialty Co.

**Sweepers, Snow. (See Snow Plows, Sweepers & Brooms.)**

**Switchboard Mats.**
Western Electric Co.

**Switch Stands.**
Kilby Frog & Switch Co.
Ramapo Iron Works.

**Switches, Automatic.**
Western Electric Co.

**Switches, Track. (See Track, Special Work.)**

**Switches & Switchboards.**
Anderson Mfg. Co., A. & J. M.
Cutter Electrical & Mfg. Co.
Delta Star Electric Co.
Electric Service Supplies Co.
General Electric Co.
Western Electric Co.
Westinghouse Elec. & M. Co.

**Tampers, Tie.**
Ingersoll-Rand Co.

**Tapes and Cloths. (See Insulating Cloths, Paper and Tape.)**

**Telephones and Parts.**
Electric Service Supplies Co.
Western Electric Co.

**Testing Clips.**
Frankel Connector Co.

**Testing, Commercial & Electrical.**
Elec'l Testing Laboratories.
Hunt & Co., Robert W.

**Testing Instruments. (See Instruments, Electrical Measuring, Testing, etc.)**

**Thermostats.**
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Titanium-Treated Rails in use at Fall River Mass.

# TITANIUM-TREATED RAIL
## in the Bay State

—on the lines of the Bay State Street Railway—have been for some time installed in Fall River and in Methuen, Mass.

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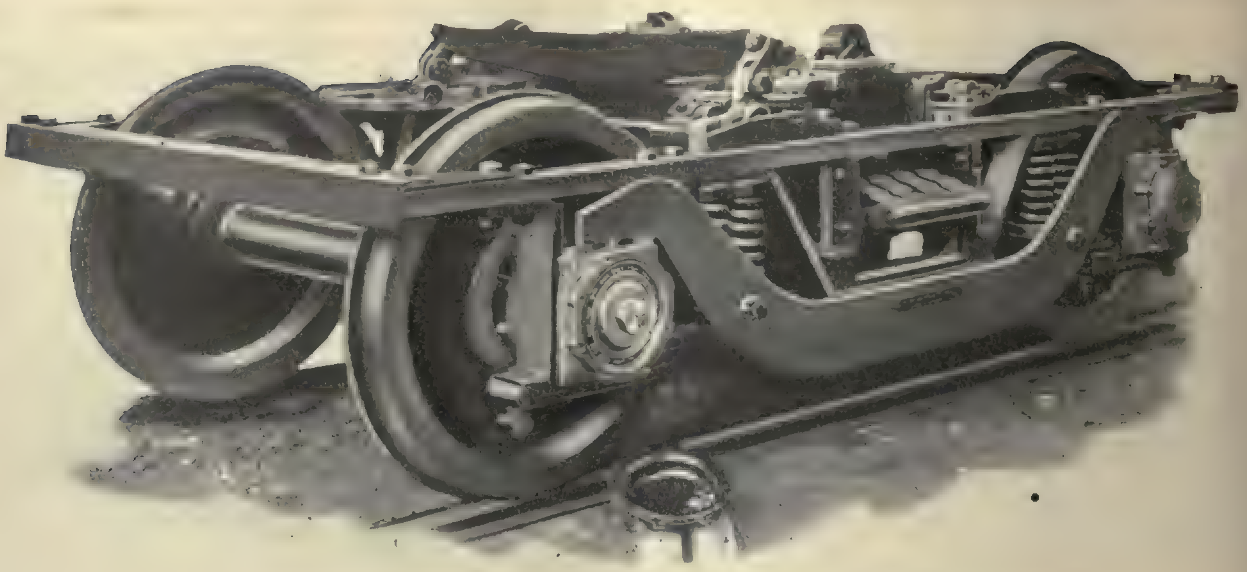

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**Chicago, Ill.** **Jamestown, N. Y.** **New York City**

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**GURNEY**

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The links which suspend the semi-elliptic bolster springs from the frame of Brill short-base pivotal trucks are milled, as shown in the picture, to correspond with the finish of the frame saddles in which they rest. These saddles are formed in the solid-forged side frames and their purpose is to give a larger bearing surface to the links than offered by the thickness of the frame and so provide sufficient friction to dampen the side swing of the car body on curves and prevent swaying on uneven tracks.

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# Making the Most of Publicity in Denver

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*There is an efficient Peter Smith Heater for every condition of electric railway service.*

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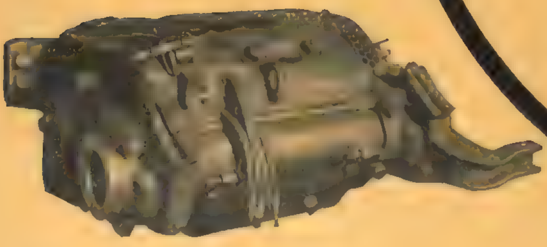
**Sales Offices in All Large American Cities.**



Westinghouse 514-C Motor, 40 hp., 600 volts. The "Baby" Motor arranged for 30" or 33" wheels. Leaflet 3591 gives full description.

# Westinghouse

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H. W. BLAKE, Editor

VOLUME 50, No. 5 NEW YORK, AUGUST 4, 1917 PAGES 173 TO 212

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1

# Operators of Safety Cars Never Want to Return to the Old Style

*This is the first of six little conversations on the salient points of the light weight safety car, which the Safety Car Devices Company have, more than any other company, been the means of bringing to its present position of importance in the Trolley Car World.*

The many railways that have introduced the safety car controlled by one operator, fully equipped with the Automatic Safety Devices of this Company, have not only pleased the public but also have pleased the men who were chosen to operate the cars.

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Because they found the work easier—

Because they found sole responsibility more agreeable—

Because they found the passengers better satisfied—

Because they found more traffic meant more pay. No reduction in jobs.

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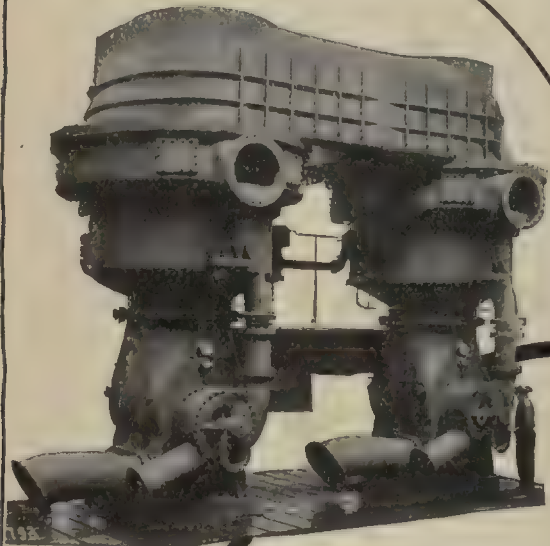

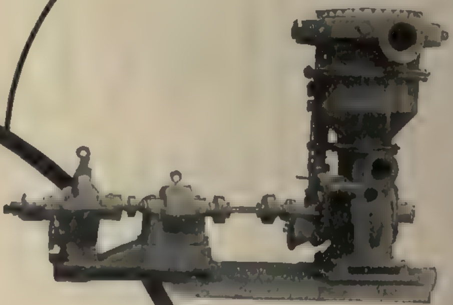

## Simplicity and Compactness

Simplicity and Compactness are important features of all Westinghouse Leblanc Jet Condensers, from the small Ejector Type to the Twin Jet installations for the 40,000 kw. Turbine.

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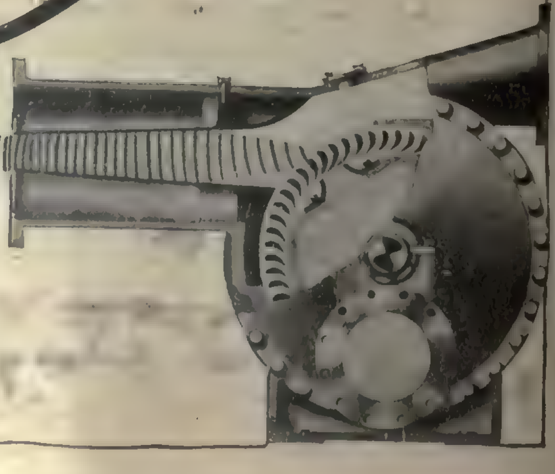

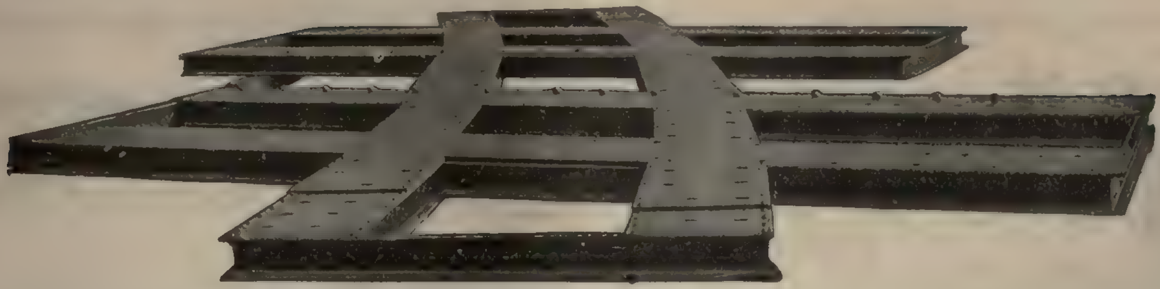

# The Solution for One of the Most Difficult Track Problems

# INTERNATIONAL
## STEEL CROSSING FOUNDATIONS

Crossing frog maintenance and renewals are the bane of the railway maintenance department. Racking on the unstable foundations furnished by any arrangement of wooden ties is the principal cause of this condition. Crossing frogs are continually out of line and surface. Bolt and filler block breakages soon wreck perfectly good crossing frogs.

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The steel foundation furnishes a large spread bearing that bridges the soft spots in the ballast and supports the joints. The steel bearing absolutely prevents movement between the members forming the frog.

Isn't this the answer to your particular difficulties? Why put off the day of determining for yourself what many others know from experience. Let us prove our claims to your satisfaction.

**Prompt deliveries made from stock**

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**Manufacturer of Steel Twin Ties and Crossing Foundations**

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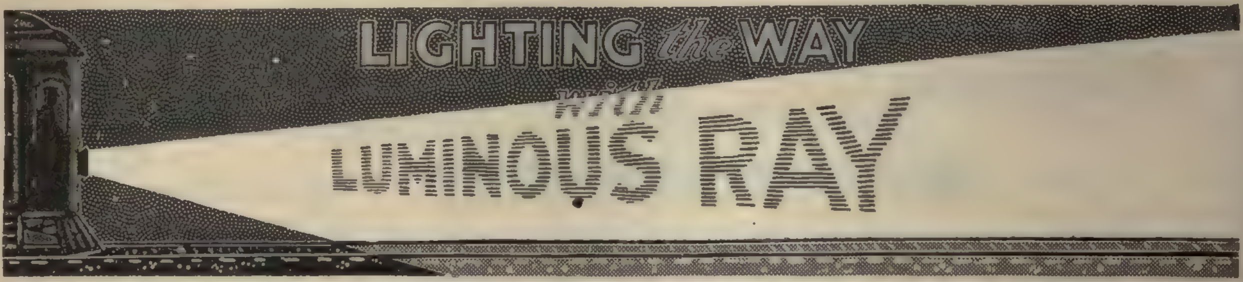
| | | | | | |
|---|---|---|---|---|---|
| Western Eng'g Sales Co.,<br>Los Angeles, Cal. | San Francisco, Cal.<br>Seattle, Wash. | R. J. Cooper Co.,<br>Salt Lake City, Utah | J. E. Lewis & Co.,<br>Dallas, Texas. | Maurice Joy,<br>Philadelphia. | William H. Ziegler,<br>Minneapolis, Minn. |



# Good Light on Poor Voltage

It is imperative that the motormen on your high-speed cars have plenty of light all the time. For at night there can be safety only if there is light.

Crouse-Hinds Imperial Luminous Arc Headlights preserve their efficiency in spite of wide voltage fluctuations. Even though the voltage drops abnormally they continue steadily to throw a powerful, far-reaching beam down the track.

Not only will your operation be made more safe but your schedule can be more closely adhered to when Imperials are "Lighting the Way with Luminous Ray."

Type LAA—Luminous Arc and Incandescent.
(Incandescent lamps are used when running through lighted streets of cities or villages)

## Imperial Luminous Arcs

can be depended upon always. Their simple, rugged construction obviates trouble and forces maintenance to a minimum.

Our Engineers, specially trained, will be glad to co-operate with you. They are used to analyzing the headlight requirements of Electric Railways and they will focus on your problems knowledge based on practical experience and scientific facts.

A new catalog, No. 201-202, has just been issued. It describes the complete Crouse-Hinds Imperial line of Luminous Arc, Carbon Arc and Incandescent Headlights. Did you get your copy?

## The Ohio Brass Co.

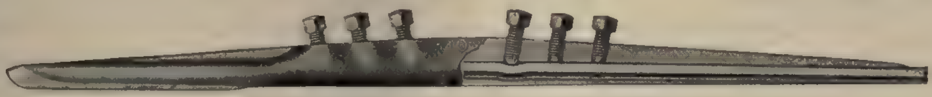
**Mansfield, Ohio**

**General Sales Agents in U. S. for
Crouse-Hinds Imperial Headlights**

# O-B Type C Splicers on the New Haven

The New York, New Haven and Hartford has standardized on Type C Splicers.

The strength and smooth under run of the Type C fit it well for the requirements on that road where trolley wires are tuned up to give as even a passage as possible for the pantographs running at high speeds and collecting heavy currents.

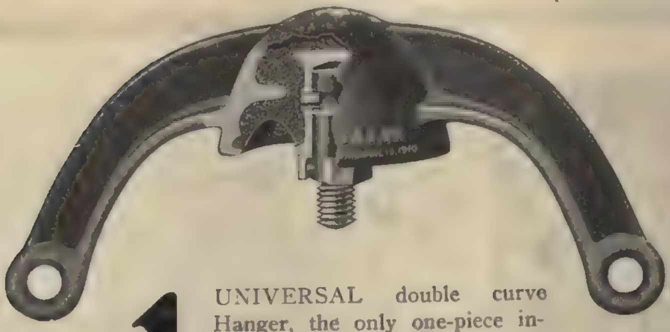


Type C Trolley Wire Splicer—Patented

Type C Splicers are easily installed. Wires go in with practically no bend and are held firmly by heavy set screws. The lips close snugly forming a passage almost as smooth as the unbroken wire.

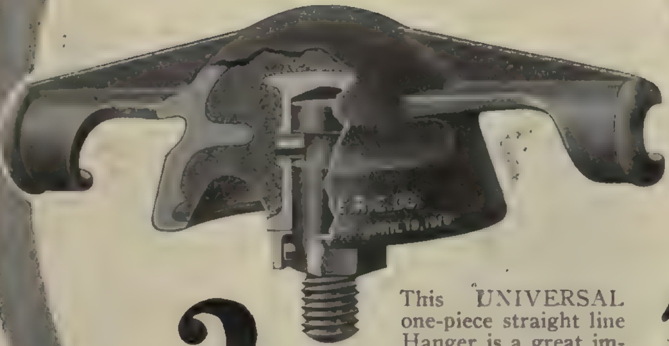
Enter a trial order and find out for yourself why they like them on the New Haven.

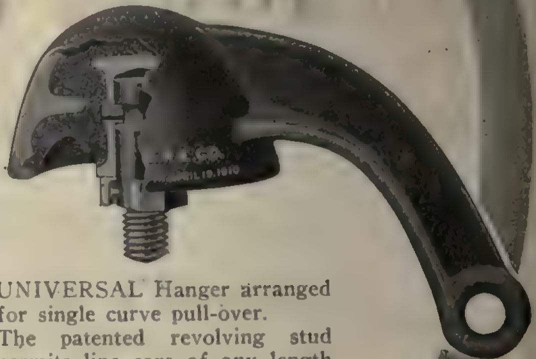
**The Ohio Brass Company**
**Mansfield, Ohio**



1

UNIVERSAL double curve Hanger, the only one-piece insulated pull-over now on the market. A great improvement over malleable iron yoke and separate insulators.





2

This UNIVERSAL one-piece straight line Hanger is a great improvement over the old type solid stud on the three-piece Hangers formerly used.

The revolving stud permits boss of ear to be drawn up tight against the Hanger face, relieving the threads from strain and insuring correct alignment of ear.

3

UNIVERSAL Hanger arranged for single curve pull-over.

The patented revolving stud permits line ears of any length to be attached to Hanger without the necessity of having removable arm as is required in similar Hangers with solid studs.

# CONSIDER

the Three UNIVERSAL Hangers shown on this page. They are worthy of your best attention.

They are one-piece Hangers, so that the disadvantages of the old three-piece Hangers are done away with.

Each Hanger has the revolving stud as an integral part of its construction. In your next order for trolley line material you'll specify these Hangers, especially if heavy suspension work on curves is to be undertaken.

Write now for further particulars.

**Electric Railway Equipment Co.**
**Cincinnati, Ohio**
**New York: 30 Church St.**

Score a bull's-eye for better public relations.

Increase your patronage.

Decrease lighting costs.

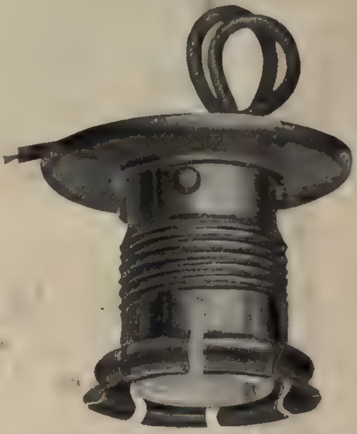
Eliminate broken glassware and the consequent damage claims.

You can do this by installing

# "Safety" Car Lighting Fixtures

"Safety" Car Lighting Fixtures are specially designed for Railway use. They will not rattle in the holder; are free from loose screws, springs or other intricate parts; they hold the reflector primarily by flexible fingers so that the reflector cannot possibly break or fall, and they necessitate only one-hand operation to remove and replace the reflector.

And you will find that "Safety" Fixtures when used in combination with suitable reflectors and Mazda lamps will almost invariably reduce current consumption 50% as compared with bare lamps. They are designed for use with various types and sizes of reflectors and lamps, so that proper relation between reflector and lamp is assured in any combination.



"Safety" Fixture, with clamping sleeve removed, showing flexible fingers which are sufficiently rigid to hold the reflector until the clamping sleeve is screwed down in place.

Their superiority is best proved by the fact that over 100,000 are in use on steam and electric railways in the United States, their safety features being an almost universal requirement.

Your patrons will quickly appreciate the improved car lighting made possible by these fixtures. Well lighted cars make more money.

*Write for special booklet.*

**ELECTRIC SERVICE SUPPLIES CO.**

***Manufacturer of Railway Material and Electrical Supplies***

PHILADELPHIA, 17th and Cambria Sts.
NEW YORK . - 30 Church St.
CHICAGO . Monadnock Building

Canadian Distributors: Lyman Tube & Supply Co., Ltd., Montreal, Toronto

Bracket Type

Straight Pendant Type
Round Base

# Replace Your Worn Center Bearings With Hartman

**Raceways that don't Pit**

**Increase Life of Wheels**

**Will Fit Almost Any Truck**

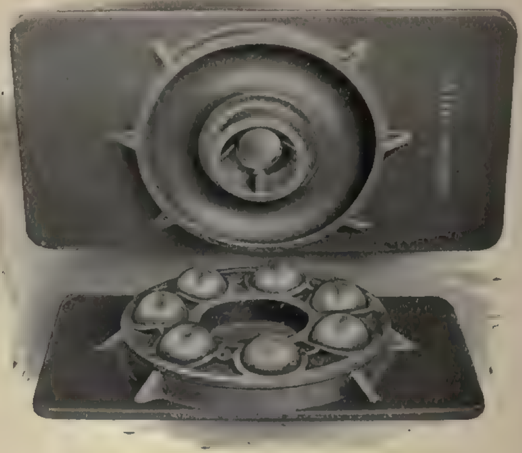
**Are Self-Centering**

**No Lubrication Needed**

Undoubtedly you have cars with worn center bearings—either plain or anti-friction. Why not try out some Hartman self-centering plates on these cars?

You will find that they about double the life of wheels, cutting in half the cost of renewals and removals for grinding. They reduce truck nosing and decrease power consumption on curves. The shape of the raceways prevent pitting and the balls are 2⅛ inches in diameter, made of forged steel.

Combined with Perry anti-friction side bearings they give you ideal truck operation. Or they can be used with ordinary friction side plates.



**Send for dimension sheets and Catalogue No. 10. We can tell from the former how to supply you with proper bearings for ready application.**

**Put Them On Your *Old* Cars**

## Holden & White Inc.

**Electric Railway Sales Distributors for The Joliet Railway Supply Company**

**1508 Fisher Building, Chicago**

National Railway Appliance Company, New York and Washington; Grayson Railway Supply Company, St. Louis; W. M. McClintock, St. Paul; Alfred Connor, Denver; C. E. A. Carr, Toronto; W. F. McKenney, Portland, Ore.; F. F. Bodler, San Francisco; S. I. Walles, Los Angeles; O. H. Davidson Equipment Co., Salt Lake City.

# Phono-Electric

## Canal Street, New Orleans

Canal Street, New Orleans, is both the line which separates the French quarter from the American section—

and the great traffic artery of the Crescent City.

One-quarter to five-eighths mile of the track on this street carries practically every car in New Orleans at headways down to 30 seconds.

No. 00 copper would stand up in this service six to eight months—No. 00 Phono-Electric is good for three years.

A difference in continuity of operation!

Canal Street, comprising about 16½ miles of single track, including suburbs, has been

**Phono-Electric**
**for eight years**

**Bridgeport Brass Company**
**Bridgeport Connecticut**

SAVE 40%

*on wire cost and maintenance and eliminate trips of the emergency truck*

In the face of decreasing net revenues, due to increase in cost of material and labor, electric railway operators should consider every means of lessening costs of installation and maintenance.

For this reason—

Aristos "COPPERWELD"
Copper Clad TROLLEY Wire

should be used because is combines the conductivity of copper with the strength of steel.

Copperweld wears uniformly and stays up more than twice as long as ordinary copper.

Fewer breakdowns mean better adherence to schedules. Let us tell you how.

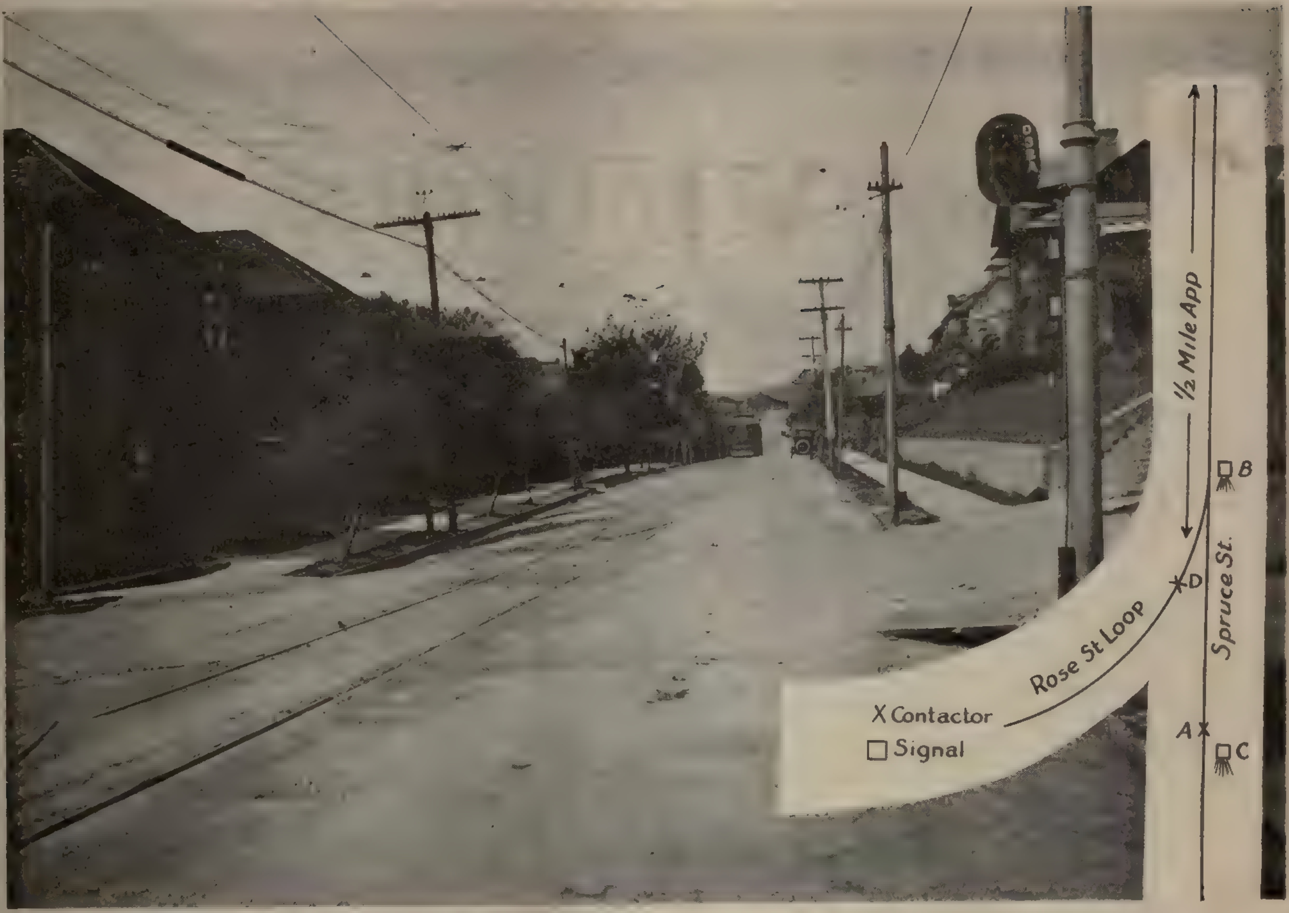
Copper Clad wire is now being drawn in Canada. We are in a position to quote favorable prices and deliveries.

**Western Sales Office:**
**Steel Sales Corporation**
**Chicago, Illinois**

**Eastern Sales Office:**
**Page Woven Wire Fence Co.**
**30 Church St., New York**

**Made from the product of COPPER CLAD STEEL CO., Pittsburgh, Pa.**
**Drawn and Sold Exclusively by**

PAGE WOVEN WIRE FENCE COMPANY
MONESSEN, PA.



*How the San Francisco-Oakland Terminal Railways*

# Avoids Fog Interference

*between following cars on a Berkeley Line*

Cars of the Grove Street route of the San Francisco-Oakland Terminal Railways run up a steep grade on Spruce Street before looping back by way of Rose Street.

In clear weather a following car has no difficulty in descrying the car on the grade, but signals are essential for protection in mist or fog.

Therefore, the railway installed this special U. S. Electric Signal equipment in 1916. Operation is as follows:

On cutting-in at A the first car sets red at C and green at B. The normal indications at C, yellow, and at B, blank, are not restored until this car loops back under the cutout contactor D.

The minimum headway on this line is 8 minutes.

A curve on this company's Piedmont line is protected in the same way.

## United States Electric Signal Company

West Newton, Massachusetts

Representatives:

Western: Frank F. Bodler, Monadnock Bldg., San Francisco
Chicago: Warren Moore Osborn, McCormick Bldg.
Foreign: Forest City Electric Service Supply Company, Salford, Eng.

# Protect and Direct Your Traffic with "UNION" Signals

The TDB System of signaling fulfills all the requirements of electric railway single track operation. It provides head-on protection and at the same time permits two trains to move in the same direction, each protected by a separate signal between turnouts.

**The Union Switch & Signal Co.**

Founded by Geo. Westinghouse 1881.

SWISSVALE, PA.

Trade Mark

Hudson Terminal Bldg.
NEW YORK

Peoples Gas Bldg.
CHICAGO

Canadian Express Bldg.
MONTREAL

Candler Annex
ATLANTA

Railway Exchange Bldg.
ST. LOUIS MO.

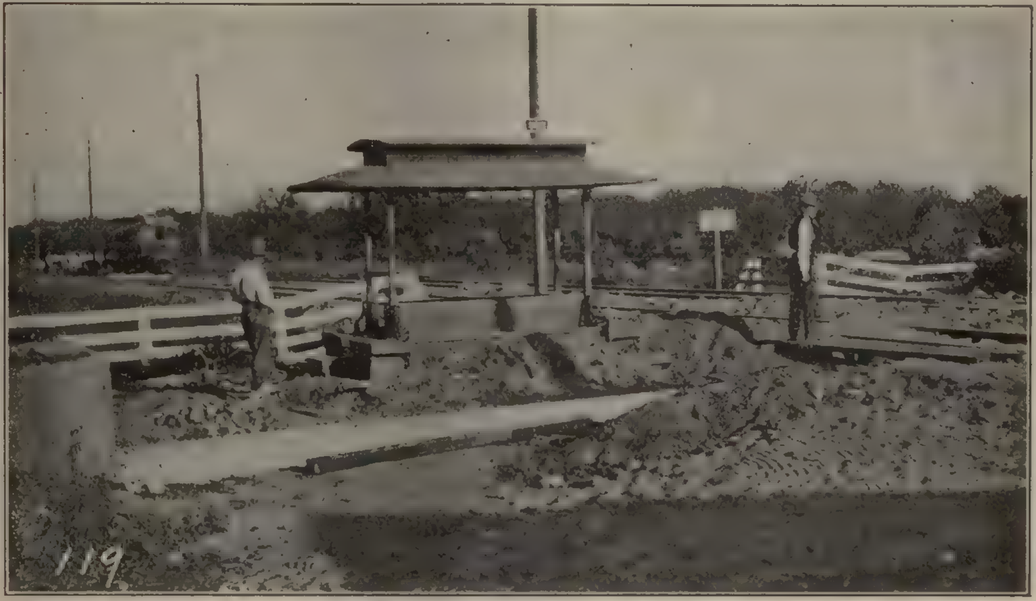
Pacific Bldg.
SAN FRANCISCO

Represented by the GENERAL ELECTRIC CO. in Australasia, South Africa and Argentina

Trade Mark

# While The Boys Are Gone To War

## labor is going to be higher-priced and harder to get than ever before



## Have You Ever Realized That

# "Armco" Iron Corrugated Culverts

are transported and installed with but a small fraction of the labor necessary for other types of construction? Skilled workers and heavy tackle are not necessary—just common sense and a minimum of elbow grease. Where "Armco" Iron Culverts are employed the ditch is often opened and closed on the same day.

For all that, they are Built To Last. Their material is the *purest* and most *durable* of irons, and their construction is the recognized standard.

Write or phone the Nearest Manufacturer for full information on Rust-Resisting "Armco" Iron Culverts, Flumes, Gates, Sheets, Roofing and Formed Products.

**Arkansas, Little Rock**
Dixie Culvert & Metal Co.
**California, Los Angeles**
California Cor. Culvert Co.
**California, West Berkeley**
California Cor. Culvert Co.
**Colorado, Denver**
R. Hardesty Mfg. Co.
**Delaware, Clayton**
Delaware Metal Culvert Co.
**Florida, Jacksonville**
Dixie Culvert & Metal Co.
**Georgia, Atlanta**
Dixie Culvert & Metal Co.
**Illinois, Springfield**
Illinois Corrugated Metal Co.
**Indiana, Crawfordsville**
W. Q. O'Neall Co.
**Iowa, Des Moines**
Iowa Pure Iron Culvert Co.
**Iowa, Independence**
Independence Culvert Co.
**Kansas, Topeka**
The Road Supply & Metal Co.
**Kentucky, Louisville**
Kentucky Culvert Mfg. Co.
**Louisiana, New Orleans**
Dixie Culvert & Metal Co.
**Maryland, Munsey Bldg., Baltimore**
Wm. M. Baker.
**Massachusetts, Palmer**
New England Metal Cul. Co.
**Michigan, Bark River**
Bark River Bridge & Cul. Co.
**Michigan, Lansing**
Michigan Bridge & Pipe Co.
**Minnesota, Minneapolis**
Lyle Corrugated Culvert Co.
**Minnesota, Lyle**
Lyle Corrugated Culvert Co.
**Missouri, Moberly**
Corrugated Culvert Co.
**Montana, Missoula**
Montana Culvert & Flume Co.
**Nebraska, Lincoln**
Lee-Arnett Co.
**Nebraska, Wahoo**
Nebraska Culvert & Mfg. Co.
**Nevada, Reno**
Nevada Metal Mfg. Co.
**New Hampshire, Nashua**
North-East Metal Culvert Co.
**New Jersey, Flemington**
Pennsylvania Metal Culvert Co.
**New York, Auburn**
Pennsylvania Metal Culvert Co.
**North Dakota, Wahpeton**
Northwestern Sheet & Iron Wks.
**Ohio, Middletown**
American Rolling Mill Co.
The Ohio Corrugated Culvert Co.
**Oklahoma, Shawnee**
Dixie Culvert & Metal Co.
**Oregon, Portland**
Coast Culvert & Flume Co.
**Pennsylvania, Warren**
Pennsylvania Metal Culvert Co.
**South Dakota, Sioux Falls**
Sioux Falls Metal Culvert Co.
**Tennessee, Nashville**
Tennessee Metal Culvert Co.
**Texas, Dallas**
Wyatt Metal Works.
**Texas, El Paso**
Western Metal Mfg. Co.
**Texas, Houston**
Lone Star Culvert Co.
**Utah, Woods Cross**
Utah Corrugated Cul. & Flume Co.
**Virginia, Roanoke**
Virginia Metal Culvert Co.
**Washington, Spokane**
Spokane Cor. Culvert & Tank Co.
**Wisconsin, Eau Claire**
Bark River Bridge & Culvert Co.

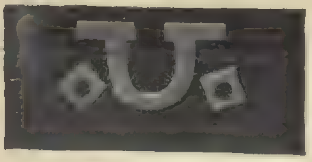
**Canada**—Canada Ingot Iron Co., Ltd., Guelph, Sherbrooke, Winnipeg, Calgary.

**ERICO PORTABLE WELDER**

**for welding standard ERICO RAIL BONDS**

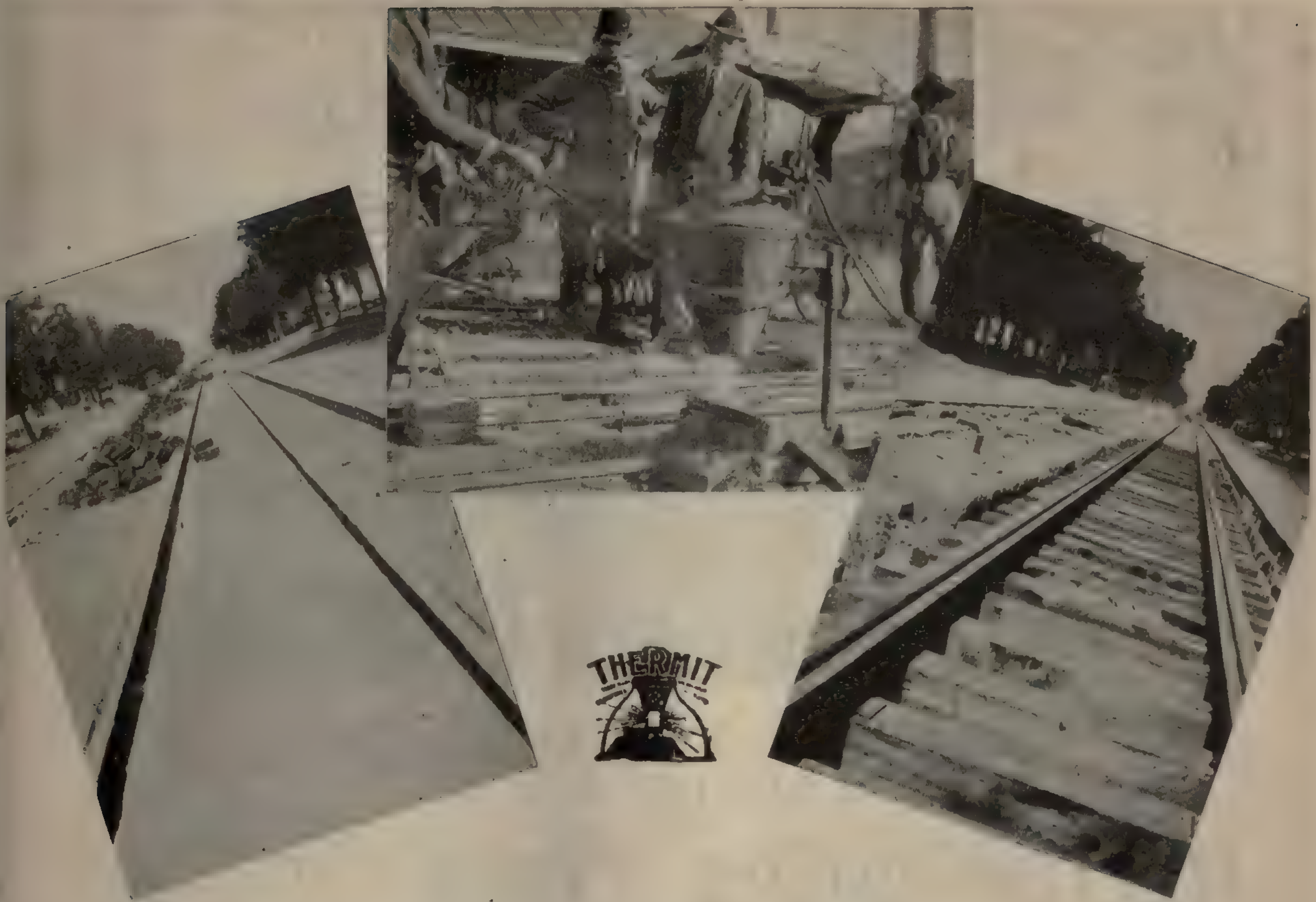
ERICO
THE LINE OF LEAST RESISTANCE

Light in weight
Portable
No rotating parts
No flame or arc strikes bond or rail
Does not interfere with traffic
Low priced



Write for particulars

The Electric Railway Improvement Co.
Cleveland



# Welding—in the *best* Sense of the WORD

***means the "Thermit" way—***

Frankly, it is not the **cheapest possible** way, but the slight extra cost of each "Thermit" Weld is amply repaid by the quality of the welds themselves—welds which after years of wear could still be shown to the president of the company with pride.

"Thermit" insert welds make rails continuous for good. No more heavy rail joint maintenance expenses, and no more electrolytic waste.

—And Compromise welds between two quite different rail ends are just as successful.

The Thermit bulletins tell how.

**Goldschmidt Thermit Company**

**120 Broadway, N. Y.**

**329-333 Folsom St., San Francisco** **103 Richmond St., W. Toronto, Ont.**
**7300 So. Chicago Avenue, Chicago**

# With Track Like This

## you are paying for a
# Reciprocating Track Grinder
## whether you buy it or not

When cupping, corrugations or indentations begin to show in the rails—that's the time to get a Reciprocating Grinder at work.

Bad track conditions never cure themselves. They just keep on getting worse unless they are taken in hand vigorously and given thorough treatment.

And the worse they get the more expensive they are to remedy when the remedy is eventually applied.

If corrugations and cupped joints are permitted to "take care of themselves," they grow steadily deeper under the impact of the car wheels. Instead of it being an easy and expeditious matter to grind the rail to a smooth condition it requires much more labor and time and necessarily demands **the removal of more of the wearing surface** than would have been the case if grinding were done promptly upon the first appearance of trouble.

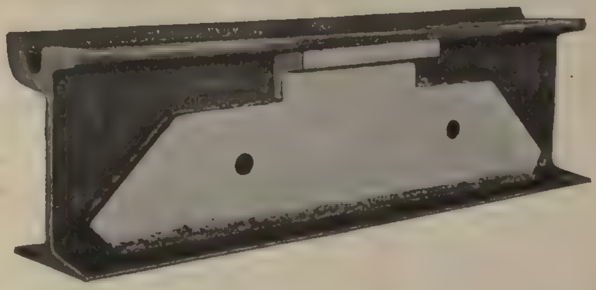
When rails need grinding, every month of delay simply **adds** to the ultimate expense.

Let us prove to you on your own tracks what an economical adjunct to maintenance a Reciprocating Grinder is.

**Railway Track-work Co.**
**30th and Walnut Streets, Philadelphia, U. S. A.**

"Simplex" Joint for High Tee Rail

"Apex" Joint: Supporting Head on Gage Side for Guard and Girder Rail



*90% of the Important Electric Railways*

use

INDIANAPOLIS

Electric Welders
Simplex and Apex Welded Joints
Fluxated Welding Steel

and find these reclamation materials indispensable for economic operation—to say nothing of the actual savings in money, estimated at

**2 Million Dollars Annually**

Reclamation of Old Track and Rolling Stock since 1912 has been an economic measure—

*Now it is a necessity*

The Indianapolis Welder
is doing a big bit in these times
of new material famine.

**Indianapolis Switch & Frog Company, Springfield, Ohio**

Deltatape Field-winding Outfit at the Shops of the United Railroads of San Francisco

# Deltatape

## Eliminated San Francisco Short-Circuits

Whoever visits San Francisco will not soon forget its amazing number of long and severe grades. Some of the lines are cable roads to this day.

In fact, it would be hard to find a tougher place for motor equipment than in the city by the Golden Gate.

The United Railroads of San Francisco used to have a lot of short-circuits with some of its motors until it undertook to rewind the field coils with Deltatape.

This railway has found, first, that Deltatape permits the winding of a much better field coil than the old asbestos; second, that Deltatape treatment has eliminated all short-circuits.

The low motor maintenance costs of D & W-supplied roads prove all we can say about

## The Big Three
## Deltabeston Wire—Deltatape—Delta Sheeting

Write for our new wire Catalog No. 5-J.

DELTABESTON WIRE REG. U.S. PAT. OFF.

## D & W FUSE CO.

Providence, R. I.

D&W REG. U.S. PAT. OFF.

# Imperial Flood Light Projectors

## *Their Points of Superiority in Design, Materials and Construction*

Type SCE (1000-watt)

All reflectors in Imperial Flood Light Projectors are parabolic. Cases are furnished with cam-acting lever catches which can be operated quickly without the use of tools.

Cases are made of rust-resisting iron. They are absolutely weatherproof and ventilated to dissipate the heat from the lamp. Bases are cast iron. All iron parts are black japanned, baked on.

Reflectors are made of mirror glass, nickel-plated, copper and polished aluminum. Mirror glass reflectors are accurately ground and polished on both sides. The backing is put on in accordance with the Navy standard. Metal reflectors are spun over accurate steel forms.

All SC types of Imperial Flood Light Projectors have lamp mounted vertically and take regular filament and PS bulbs from 300 to 1000 watts. SD types have lamp mounted horizontally and take focus type and round bulb lamps up to 500 watts.

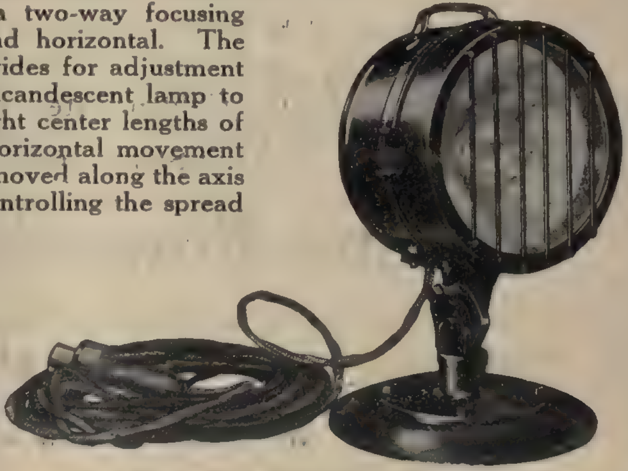
These projectors are made for stationary or portable mounting. The portable types can be had with extra large bases, which prevent them from tipping over.

All SD types of Imperial projectors have a simple focusing mechanism operated by a knurled thumb wheel at back of casing, while SC types have a two-way focusing mechanism—vertical and horizontal. The vertical movement provides for adjustment along the axis of the incandescent lamp to care for variations in light center lengths of different lamps. The horizontal movement permits the lamp to be moved along the axis of the reflector, thus controlling the spread of beam.

Type SCX (1000-watt)

Type SDY

*There is a special design of projector for each distinct requirement. Bulletin No. 303 illustrates and lists them all. Copy mailed free upon request.*


Type SDR with Railroad Yard Charging Plug

**CROUSE-HINDS COMPANY**

Syracuse, N. Y., U. S. A.

New York Boston Chicago

**Twelve things you would like to have your motormen do**

Showing recorder location on one of the cars of the Connecticut Company.

(1) Coast more.
(2) Avoid unnecessary stops and slowdowns.
(3) Release brakes early after stopping on level track.
(4) Save power, brake shoes, and wheel tires.
(5) Start and stop smoothly.
(6) Maintain proper headway.
(7) Avoid running at too high speed.
(8) Guard against rear-end collisions.
(9) Lessen the number of derailments.
(10) Report defects promptly—particularly defective brakes.
(11) Use hand brakes occasionally—enough to keep this safety feature in good working order.
(12) Operate cautiously and safely.

**Equipment of your cars with the**

**Arthur Power-Saving Recorder**

followed by intelligent interpretation to your men of the meaning of the records established and suggestions for making better records will rapidly educate your motormen to do these things. Big economies and greater safety will result.

**The Arthur Power-Saving Recorder Co.**
**New Haven, Conn.**

*"Power wasted at the brake shoes is the true measure of the motormen's relative efficiency."*

# DURADUCT

# The Perfect Non-Metallic Conduit on Scores of Seattle Cars

The first Stone & Webster Safety Car for Seattle—No. 142—was wired in DURADUCT.

And when nearly two-score other cars were equipped with electric heaters they were fitted with ¼ in. and ½ in. DURADUCT to encase the heater circuits.

And finally, beginning with car No. 108, thirty cars remodeled for safety operation have also been DURADUCT-ed to a considerable extent.

To know DURADUCT is to use it.

TUBULAR WOVEN FABRIC COMPANY
MANUFACTURERS —— PAWTUCKET, R. I.
GENERAL SALES AGENT — A HALL BERRY
71-73 Murray St., New York. 9 So. Clinton St., Chicago
*Northern Electric Company* LIMITED **Distributors for Canada**

# Higher Fares May Come, But Let INTERNATIONALS Get All the Nickels Now

INTERNATIONAL MOTOR - DRIVEN COIN REGISTERS, which accelerate fare collection by relieving the conductor of turning the handle of the fare box and by immediate registration and return of money. The Motor-Driven type is recommended for all large cars operated through congested traffic areas.

There's hardly an electric railway in the country that has not applied or that is not preparing to apply for a higher rate of fare to meet the increased cost of operation.

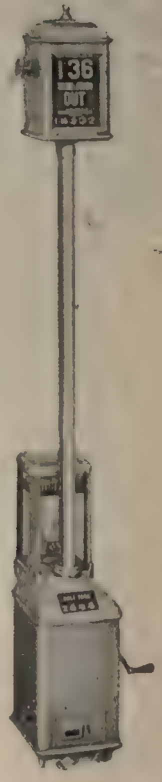
But in many instances the applicants will have to prove that they are already using

## The most efficient form of fare collection

If you adopt International Fare Collecting and Registering Devices **now**, you will not only minimize leaks in your system, but find it easier to prove your case for a higher rate of fare because International Equipments are widely recognized as embodying **the most efficient form of fare collection.**

Nor need you have any fear that a 6-cent or 7-cent fare will make your Internationals obsolete because

*International Fare Collecting and Registering Mechanisms May Be Adapted to Any Changes in Rates of Fare*

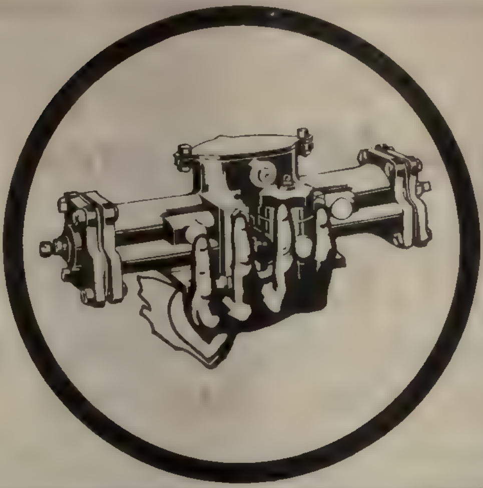


INTERNATIONAL COIN AND TRANSFER REGISTERS which eliminate registers and rods, as both registers are mounted on a column over the fare box, and transfers are registered by a pull-cord.

INTERNATIONAL COIN REGISTERS which receive and count the money with visible and audible overhead registration.

## The International Register Co.

15 South Throop Street, Chicago, Ill.



# BRAIN
## OR
# BRAWN

National Pneumatic Door and Step Control has made it possible for you to place brain before brawn in the selection of your men, conductors especially.

You know better than we that an essential factor in handling your patrons to their satisfaction is a courteous conductor.

When you put National Pneumatic Door and Step Control on your cars you greatly increase the chance to get and hold **platform gentlemen.**

And you will be pleasantly astonished, as other operators have been, at the improvement in the men you have on the job today.

**NATIONAL PNEUMATIC COMPANY**

50 Church St. New York

515 Laflin St. Chicago

## Passengers Gladly Co-operate

with an electric railway company when they once understand that the company is genuinely interested in giving them 100 per cent service.

The public have quickly learned, in all cities where it has been introduced, that

## The Johnson Metal Ticket System

offers the greatest possible convenience to passenger, conductor and company, and that schedules are better than before its use. The inevitable result is better public relations.

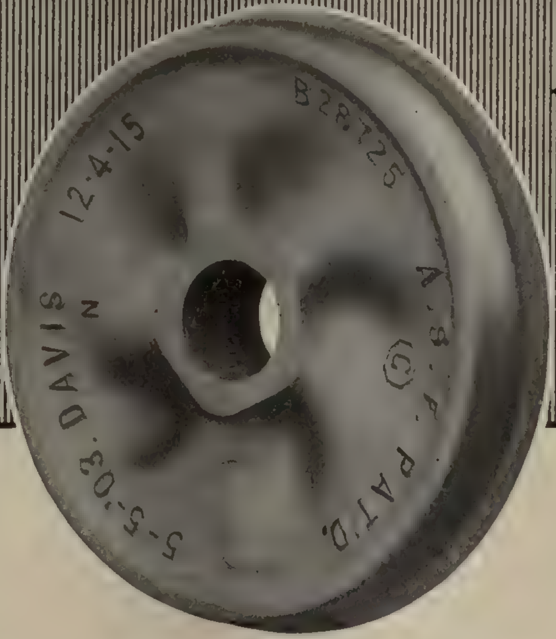
To say nothing of increased receipts—fare-tokens that can't be counterfeited and which are immediately available for re-sale—separate and immediate counting and accurate totalizing of nickels, dimes, pennies and tokens representing several different rates of fare—the elimination of the considerable money-drain involved by use of paper tickets, which cannot be re-sold.

You owe it to yourself, to your stockholders, and to your patrons, to ask for detailed information.

**Johnson Fare Box Company**
**Jackson Boulevard and Robey St., Chicago**
**50 East 42nd Street, New York**

DAVIS

STEEL WHEEL



High mileage and low maintenance cost are the reasons for its use on over 350 roads.

American Steel Foundries
1105 McCormick Building CHICAGO

# The Buyer's Interest in Wasteless Advertising

BUYERS who appreciate that waste in selling must eventually be passed on to them in some form, are paying more and more attention to the sales methods of the concerns seeking their business.

> The extravagant use of space in publications of general circulation, to advertise a commodity or a service appealing chiefly to a certain well-defined class, is not only poor judgment, but **it is an economic waste.**

Can you imagine an intelligent salesman, with a proposition for a steel mill or a dry goods store, calling at every office in town in an effort to locate a prospect? How needlessly wasteful to adopt similar methods in advertising, which is simply an improved means of accomplishing certain necessary steps of a sale.

On the other hand, the seller who uses the business papers reaching **only** the class interested in his message, is employing the most direct, efficient and economical method of getting in touch with prospective buyers.

> Properly used, the good business paper bears the same relation to the sales department, that an improved machine does to the production department. Better selling methods go hand in hand with better manufacturing methods.

To encourage wasteless advertising, the most efficient modern means of bringing buyer and seller together, there is every reason why the discriminating buyer should give preferred consideration to the concern that tells its business story in the buyer's own business paper.

**Ask this office anything you want to know about Business Papers or Business Paper Advertising.**

## THE ASSOCIATED BUSINESS PAPERS, INC.

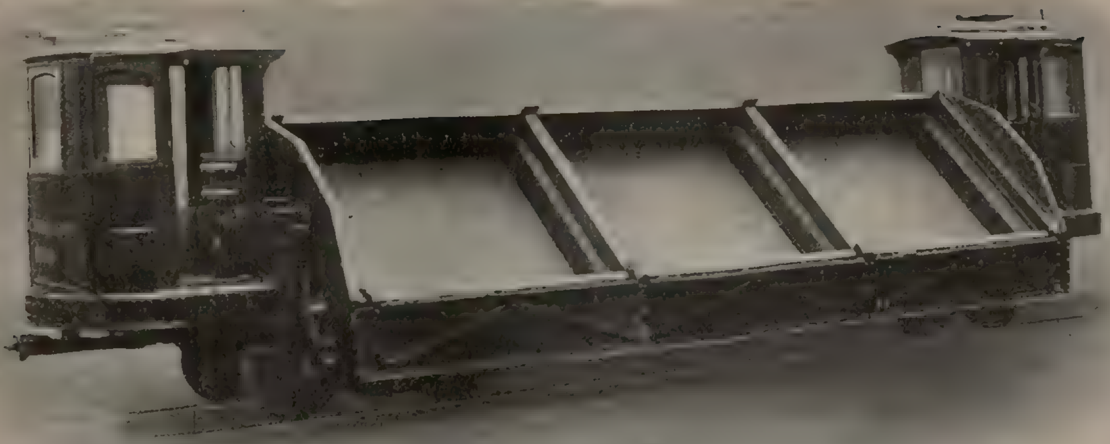
**The International Organization of Trade, Technical and Class Publications**

**Headquarters, 220 West 42nd Street**
**New York**

### LIST OF MEMBERS

Each member has subscribed to the 10 "Standards of Practice," a high code of ethics covering all departments of business paper publishing.

Advertising & Selling
American Architect
American Exporter
American Hatter
American Machinist
American Paint & Oil Dealer
American Printer
American Blacksmith
Automobile, The
Automobile Dealer & Repairer
American School Board Journal
Architectural Record
Aviation & Aeronautical Engineering
Boot & Shoe Recorder
Brick & Clay Record
Buildings & Building Management
Bulletin of Pharmacy
Canadian Grocer
Canadian Railway & Marine World
Cement World
Clothier & Furnisher
Coal Age
Concrete
Domestic Engineering
Drygoodsman, The
Dry Goods Economist
Dry Goods Reporter
Editor & Publisher
Electrical Review & Western Electrician
Electrical World
Electric Railway Journal
Electric Traction
Engineering & Mining Journal
Engineering News-Record
Farm Machinery—Farm Power
Furniture Manufacturer & Artisan
Grand Rapids Furniture Record
Haberdasher, The
Hardware Age
Hide & Leather
Hotel Monthly
Illustrated Milliner
Implement Age
Industrial Arts Magazine
Inland Printer
Iron Age
International Trade
Lumber Trade Journal
Lumber World Review
Manufacturing Jeweler
Marine Engineering
Metal Worker, Plumber & Steam Fitter
Metallurgical & Chemical Engineering
Modern Hospital
Motor Age
Motor World
National Builder
National Druggist
National Petroleum News
Power
Practical Engineer
Railway Age Gazette
Railway Electrical Engineer
Railway Maintenance Engineer
Railway Mechanical Engineer
Railway Signal Engineer
Shoe & Leather Reporter
Shoe Findings
Shoe Retailer
Tea & Coffee Trade Journal
Textile World Journal
Transfer & Storage
Woodworker



THIS is the DIFFERENTIAL ELECTRIC DUMPING CAR, built of steel throughout and designed in every detail for the cheaper and quicker handling of material along the line.

One man alone runs the car and dumps the material, which, owing to the large overhang of the tilting body, is thrown at least 3 feet from the track, and requires no further shoveling.

Another exclusive feature is the extremely low center of gravity of our cars, allowing the bins to be filled with the greatest speed and saving of labor.

If you have much handling of material or freight on your line get our descriptive bulletins, and then inspect a DIFFERENTIAL ELECTRIC DUMPING CAR in action and—actions speak louder than words.

## DIFFERENTIAL CAR COMPANY

**H. FORT FLOWERS**
**Pres. & Gen. Mgr.**

**141 Broadway, N. Y.**

---

## TROLLEY WIRE

### Round Grooved and Figure 8

If you will agree that one make of trolley wire is able to give longer service than another make—

That one is more economical than another—

Then investigate our trolley wire with a view to cutting your wire costs.

STAR BRAND
Made to Wear
To Wear
Well
WEATHER PROOF WIRE

## Weatherproof Wires and Cables

### Star Brand

Star Brand Wires are made with long service as the most prominent feature.

Because of their ability to render long service they cut wire costs.

Read the words in the cut of the star.

## American Electrical Works

NEW YORK: 165 Broadway
CHICAGO: 112 West Adams Street
BOSTON: 176 Federal Street

Phillipsdale, R. I.

CINCINNATI: Traction Building
SAN FRANCISCO: 612 Howard Street
SEATTLE: 1002 First Avenue South

3105

# THE MILLER

## Sliding Trolley Shoe gives you the economy of STEEL instead of the extravagance of COPPER

With trolley wheels being quoted at 70c to $2.00 each, according to diameter, the immediate economy of

The Miller Trolley Shoe with steel insert stands out stronger than ever, because the prices of steel and copper are further apart than ever.

The **insert** of the Miller Trolley Shoe, made of steel and costing only a fraction of a dollar, easily outwears the ordinary and expensive copper trolley wheel.

With decreased wear of the trolley wire, too, because its **clinging, sliding** contact prevents the greatest causes of wire wear—sparking, pitting and burning, aside from saving broken poles and distorted overhead.

If you give us the size and height of your trolley wire and the tension of your trolley bases, we shall be glad to explain how

***You also can enjoy the savings of the Miller Trolley Shoe***

SALES
REPRESENTATIVES
Alfred Connor,
Denver, Col.
T. C. White & Co.,
St. Louis, Mo.
W. M. McClintock,
St Paul, Minn
Holden & White, Inc.,
Chicago.

**Miller Trolley Shoe Co.**
**South Boston, Mass.**

SALES
REPRESENTATIVES
W. F. McKenney,
Portland, Oregon.
F. F. Bodler,
San Francisco, Cal.
S. I. Wailes,
Los Angeles, Cal.

# COLUMBUS, GA.

## Another Stone & Webster Property adopts Rico Coasting Recorders

The Columbus Electric Company is the latest property under Stone & Webster management to appreciate the merits of the Rico Coasting Recorder as a means for raising the morale of the motorman, lowering power, brakeshoe and upkeep costs and improving schedule speed to permit more service to be given with the existing number of cars.

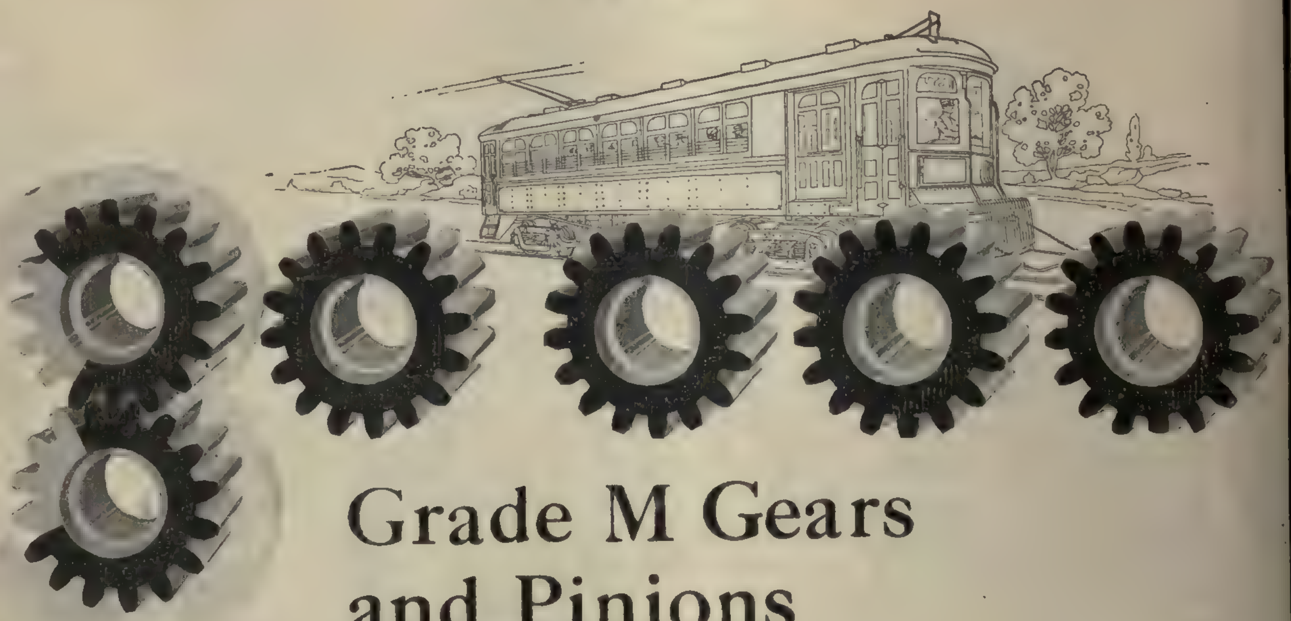
The variety of conditions—city, suburban, interurban, rapid transit and steam electrification—under which Rico Coasting Recorders have made good is proof that coasting time and a printed record thereof—embody

## The True Principle for Measuring Operating Efficiency

## Time is the Essence of Railroading

RAILWAY IMPROVEMENT CO. RICO 61 BROADWAY, NEW YORK

# Over



# Grade M Gears and Pinions

were sold during 1916. Business was expanding and more gears of all kinds were required. But a large percentage of this increase was due to the preference for Grade M over all other makes.

## More Miles per Dollar

are obtained from Grade M Gears. Most of the progressive railways of the country have found this to be true from experience.

Grade M Gears are forged steel especially hardened and tempered. This insures a hard and tough gear, giving a long life and freedom from breakage.

# General Electric Company

**General Office: Schenectady, N.Y.**

ADDRESS NEAREST CITY

Atlanta, Ga.
Baltimore, Md.
Birmingham, Ala.
Boston, Mass.
Buffalo, N. Y.
Butte, Mont.
Charleston, W. Va.
Charlotte, N. C.
Chattanooga, Tenn.
Chicago, Ill.
Cincinnati, Ohio
Cleveland, Ohio
Columbus, Ohio
*Dallas, Texas
Dayton, Ohio
Denver, Colo.
†Detroit, Mich.
Des Moines, Iowa
Duluth, Minn.
Elmira, N. Y.
Erie, Pa.
*El Paso, Texas
Fort Wayne, Ind.
Hartford, Conn.
*Houston, Texas
Indianapolis, Ind.
Jacksonville, Fla.
Joplin, Mo.
Kansas City, Mo.
Knoxville, Tenn.
Los Angeles, Cal.
Louisville, Ky.
Memphis, Tenn.
Milwaukee, Wis.
Minneapolis, Minn.
Nashville, Tenn.
New Haven, Conn.
New Orleans, La.
New York, N. Y.
Niagara Falls, N. Y.
*Oklahoma City, Okla.
Omaha, Neb.
Philadelphia, Pa.
Pittsburgh, Pa.
Portland, Ore.
Providence, R. I.
Richmond, Va.
Rochester, N. Y.
St. Louis, Mo.
Salt Lake City, Utah
San Francisco, Cal.
Schenectady, N. Y.
Seattle, Wash.
Spokane, Wash.
Springfield, Mass.
Syracuse, N. Y.
Toledo, Ohio
Washington, D. C.
Youngstown, Ohio.

*Southwest General Electric Company. †General Electric Company of Michigan.
For CANADIAN BUSINESS refer to Canadian General Electric Company, Ltd., Toronto, Ont.
GENERAL FOREIGN SALES OFFICES, Schenectady, N. Y.; 30 Church St., New York City; 83 Cannon St., London, E. C., England. 7181

# Electric Railway Journal

Published by the McGraw-Hill Publishing Company, Inc.
Consolidation of Street Railway Journal and Electric Railway Review

Volume 50 NEW YORK, SATURDAY, AUGUST 4, 1917 Number 5

## It Is Important to Check Transfers

THEORETICALLY, every transfer presented for passage on the cars should be checked by the auditing department before it is destroyed. Actually, however, such a plan would involve too much time and labor. Hence, the common practice is to check only a portion of the transfers, usually all those of one or two lines being taken each day so that all of the lines will be included, though not in any regular system of rotation, within a comparatively brief period. If this plan is carefully followed, it is undoubtedly adequate, but we have observed a tendency toward slackness by some companies in this respect. Electric railway managers must remember that as each transfer represents a ride, it is potentially worth 5 cents to the company, whether the practice on the road is to register transfers or not to do so. In other words, unless care is taken to prevent transfer abuse by passengers and conductors, a large loophole is left for the escape of fares. Of course money can be wasted in too elaborate systems of auditing transfers, but we believe that more roads err on the side of laxity in this respect than from over-caution.

## The Use of Short-Term Notes at the Present Time

THE proposed financing of the power deal involving the Lehigh Valley Transit Company shows the situation that is to-day confronting the corporate borrower. As noted last week, the banking syndicate, in the tying together of the various plants concerned, plans to use an issue of $20,000,000 of ten-year 6 per cent notes. Such short-term media are not unexpected in view of the existing financial conditions. Government bond offerings, generally upon at least a twenty-year basis, have at present, for patriotic reasons, the first call upon our national resources. The Farm Loan bond business is another source of important competition, and there are many bargains in old bonds in the general market. To compete even to a small degree with the federal issues and to meet the high yield on outstanding bonds, the business of the country must pay a high rate. But this does not mean that corporations need commit themselves for a long term of years to 6 per cent money, for it is feasible to defer long-term bonds until peace is restored. Thus one finds corporations issuing notes for even shorter periods than the proposed Lehigh issues—for one, two or three years, at a rate sufficient to be attractive. This method of financing seems advisable, pending the restoration of normal conditions. It would probably be well, however, to remember that any financing will be easier during the lulls between Liberty Bond offerings.

## A Patriotic Spirit Will Offset Draft Reaction

THERE is no doubt of the existence of a feeling of uncertainty and unrest in the electric railway ranks, as in others, due to the present and prospective drafts of men for military service. It will require special effort to maintain discipline under these conditions. There may even be a tendency among the younger employees subject to draft to become careless in their work, feeling that they are about to leave their present employers anyway and that it matters little what they do. A patriotic spirit will prevent such an unwholesome reaction from the draft, which has been adopted equitably to distribute the burden of the war so far as man power is concerned. Those who go and those who remain behind will equally contribute to the winning of the war if they possess the proper spirit. Such a spirit is not that of the motorman who thinks that he can take chances or the conductor who feels that he can knock down a few fares because he is not going to be in his present job very long anyway. Such a man would make as poor a soldier as he is a railway employee. In spite of the difficulty which railways are having in keeping up the quantity as well as the quality of their labor supply, we believe that such virtual slackers are far from representative. Nevertheless, it is incumbent upon railway managers to promote a spirit of patriotism among their employees, not only because it is the right and proper thing to do but also because it will help the men to keep their standards of service high, whether or not they expect to join the army soon.

## Low Wages Are Often a Waste of Money

IN commenting last week on the question of pay for rainy days to track gangs, we referred to the difficulty of obtaining labor of this kind at the rates which railways think they can pay or ought to pay. Several construction engineers who have read that editorial say that the belief of many managers that low wages are adequate for this sort of work is the crux of the problem. One of them writes:

"Laborers are being paid 40 cents an hour all through the towns in this valley, and my instructions this year were to get men for 20 cents an hour. We are now paying $2.50 a day for ten hours' work on the track. It is not work, however. We are simply donating $2.50 a day to the finest collection of human flotsam that was ever washed ashore at Cull Harbor. I could hire one good man for $3.20 a day who would do more work, heavier work, better work, more intelligent work than a pair of the half-dead culls that now cost us $5."

It should be borne in mind that poor labor in track construction is not only inefficient in itself, but it is demoralizing to the gang foremen, who are usually the better men carried by the company on a monthly basis throughout the year. Poor laborers cause these men to become discontented and leave for higher-waged though less certain employment in other industries. That this is the case is evidenced by a recent canvass of fifteen of the larger companies in all sections of the country.

The problem is a serious one to maintenance-of-way engineers throughout the country. They come into direct contact with the poor labor used in many track gangs and thus realize the situation. One of them suggests, as a partial solution, that an effort be made to carry a few of the best track men through the winter so as to insure them an all-year job. They could be kept at tightening bolts, cleaning up brush, mending right-of-way fences and other jobs which are suitable for winter and would form the nucleus when the spring came of a good section gang which would be satisfied with moderate wages. We stand with them in believing that good work on the track is essential and that cheap labor is usually inefficient labor and uneconomical in the long run.

## High Altitude in Service as Well as Location

THE rare air and the magnificent view in which the Denver Tramway men live and work may be the source of inspiration for the real accomplishment in evidence in the operation of this Western railway property. Or perhaps it is only a keen perception of the future that is responsible for the marked progress in conditions, both internally and with respect to the public which this company is enjoying. Whatever may be the background, there is no gainsaying the fact that the Denver Tramway organization is working out new solutions of electric railway problems. Part of this work has been described in recent issues of this paper. Another article in this issue tells of the publicity policies of the company, while others which will appear in succeeding issues will cover some of the details of the company organization and management. The one-man car idea is undergoing study in anticipation of its adoption in Denver, in a way which, it is hoped will greatly increase its desirability. Other schemes equally interesting and vital are being worked out to provide for the needs of the times.

An outstanding feature of this company's printed talks to the public is the truthfulness and sincerity with which it puts forth any discussion of the service being rendered. No hint of any attempt to cover up deficiencies through nice talk can be gleaned from any of the company's publicity. The watchword handed down from the general manager and permeating the whole organization is service, and no statement is made in any advertising literature which the company is not prepared fully to back up. No advertising campaign was ever continuously successful unless the goods proved to correspond to their representation, and this is the governing policy of the Tramway company in all its publicity matter. It is in the market to sell transportation and expects to be continuously in this business. Therefore, it cannot afford to misrepresent. If there are deficiencies, they are admitted but corrected as rapidly as possible. If there are complaints and criticisms, these are gladly received, for some of them carry valuable suggestions for the improvement of the service. If the tramway is at fault, the publicity manager does not hesitate to take a "rap" at his own company. This induces confidence in the veracity of the mouthpiece of the corporation. The publicity manager is directed in his relations with the balance of the organization, to maintain the viewpoint of the public and in short to be the public's special representative in the company conferences. This is indicative of the real intent to be of maximum service to the public in fact as well as in theory.

## Railway Men Must Let the Light of Publicity Shine

READERS of the great metropolitan newspapers feel that they are entitled to find in the editorial pages at least evidences of intelligent consideration and careful thought. What, then, are we to say when we come upon such paragraphs as these which appeared the other day in the New York *Evening World* in discussing a raise in car fares?

> * * * is it the duty of these American people to bear added burdens in order that no street railway corporation shall have to reorganize its business methods or share by so much as a fraction of a per cent of its accustomed dividends? * * *
>
> Twenty-eight up-State traction companies have already petitioned the Public Service Commission for permission to increase their fares from 5 to 6 cents.
>
> Think what this means for the corporations, a comfortable increase of 20 per cent in revenues. * * *
>
> The distraction and confusion of war must not for one instant be allowed to serve as a cover under which street railway corporations may shift their share of the general load to the shoulders of the public.

There is no evidence here whatever that the writer has ever conceived the situation as involving anything but sentiment. He seems to think, as so many critics do, that the electric railway corporations have countless millions of annual profits and have only to make up their minds to be happy with a bit less. It is quite apparent that he does not know that many of the companies are paying no dividends, that some are not making even interest on their bonds, and not one is making enough to make either its stock or bonds a prime investment. He has no apparent glimmering of the idea that this situation means just one thing to the public—that the public will be the real sufferer if the companies are made to suffer. The public must appreciate the absolute certainty that if this business situation continues with the carrier companies the public will have to get along soon with fewer cars, passengers will have to stand closer together and will lose many car lines altogether.

This editorial writer never stopped to think that the business of furnishing street railway rides cannot go on indefinitely with fixed fares and rising costs any more than selling clothes, furniture, food or coal can continue under the same conditions. The companies are not caught red-handed trying to "put something over." They show the public and the Public Service Commission the facts and ask only a judgment that will be fair to them and at the same time keep up good service for the public.

Now for the real point, the point that prods the electric railway man himself.

Such crass editorial ignorance of a simple public business proposition is due to the fact that the electric railway men haven't made the facts of their business known. Newspaper editors are not so foolish or hateful as not to perceive that a company whose expenses are growing faster than its income is headed toward bankruptcy. Now, if the editors lack information and appreciation of the facts, how much more will the public generally lack them? No one but the railway people can change this. The need of intelligent and persistent publicity about the electric railway business is proved merely by the appearance of such writings. Nothing else can clear away the darkness of mind that leads to such misconceptions. These misconceptions, through repetition to millions of readers in the columns of the press, may do enormous damage.

There is no good reason to suspect malicious intent on the part of at least the majority of the papers. They are really open to the truth and intelligent presentation of the railway case. But the railway men must illuminate the darkness.

## Now Is the Time to Get the Skip Stop Going

WE cannot withhold a word of praise for the wide-awake manner in which our neighbors in the transportation field—the steam railroads—are adapting their transportation methods to the abnormal conditions brought about by the war, and we believe that the electric railways could gather some suggestions from what they have done. Judging by reports, the steam railroads are undertaking everything and anything that spells economy—such as reducing the number of passenger train units, taking off diners and sleepers and accepting l.c.l. shipments only once a week, and the public applauds because it recognizes that these things are helpful for the country at large and so are necessary. This should give the electric railways heart, not only in the fare contest but in introducing other reforms. No such radical changes, so far as the public is concerned, as the steam railroads are making need be applied because there are at hand for the electric railways plenty of possible economies that do not depend upon reduced service for their introduction. All that is involved is a relaxation of popular opposition to improvements, and this seems to be very much in evidence to-day.

Probably the most prominent of such means for economy without reduced service appears in the skip stop. This has been definitely established as a time-saver to both public and railways for at least two years, but the number of cities where it has actually been introduced is painfully small. Places where it has been tried out and has "failed" are somewhat more numerous, but still the list of railways that have taken up the subject vigorously includes but an insignificant percentage of those that would benefit by such a change.

Part of this lack of energetic interest may be due to the apparent pettiness of the savings involved, and it is true that there are some conditions where the introduction of the skip stop will effect no direct economy and very little improvement in service. However, they are by no means in the majority. Generally speaking, they include short lines with infrequent headway, and under such circumstances the existing frequency of stops makes very little difference in the result. For example, there may be assumed a 4-mile round trip with a fifteen-minute headway served by two cars. The apparent schedule speed would then be 8 m.p.h., and allowing two minutes for layover the actual schedule speed would be about 9 m.p.h. With good equipment and limited interference, this schedule could be maintained with about ten actual stops per mile, but the advantage gained by cutting out half of the designated stopping points and thus reducing the actual stops to, say, about six per mile would hardly mean anything more than an increased layover. Elimination of four stops per mile or sixteen stops in each 4-mile round trip at fifteen seconds each (including acceleration and braking periods) would save four minutes out of the thirty originally required and, assuming an even distribution of patrons over the route, would save the average patron one minute at the expense of a schedule that would make the cars pass at odd times.

Double the assumed length of the line, however, and cut the headway to ten minutes, and the skip stop presents a wholly different aspect. Using the same actual schedule speed as assumed in the foregoing paragraph, six cars would then be needed to serve the run, allowing four minutes' layover. A reduction from ten actual stops per mile to six would save eight minutes in the time of each round trip, and if two minutes are cut off the layover, only five cars instead of six would serve the run, since the time for each round trip would be fifty minutes instead of sixty.

The outlined increase in actual schedule speed would save the average patron two minutes and the patron at the end of the line four minutes in each ride—well worth consideration. At the same time the increase of 16 per cent in apparent schedule speed would produce a saving equivalent to 11 per cent of the operating expenses of the line. This is also well worth consideration. The saving in fact, is equivalent to no less than a third of the gain to be effected by introducing the 6-cent fare under normal conditions.

# Making the Most of Publicity

## Denver Tramway Has Found Humor the Wedge to Public Understanding of the Railway Problems—Special Publication For and By the Employees Is Popular and Worth While

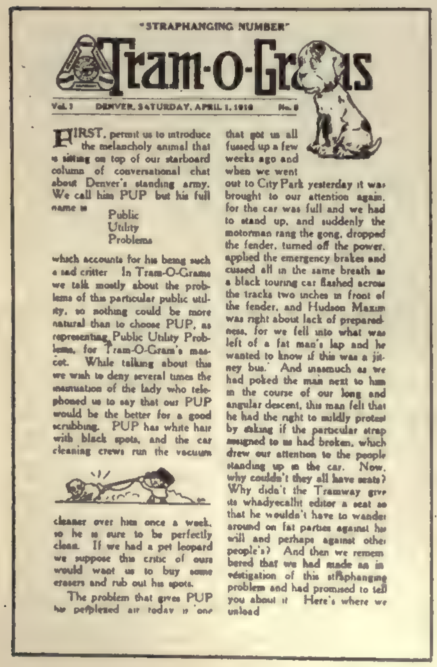
CONSISTENTLY living up to the declared intention that its publicity should not in any sense constitute a whitewash for the deficiencies of the company, and frankly turning the searchlight of public scrutiny on itself and admitting some imperfections, the Denver Tramway Company has for a year been steadily gaining ground in public favor. It took some seven or eight issues of the little now-much-sought "Tram-O-Grams," the company-public magazine, to overcome frequent references to this utility sheet by such titles as "Tramway Bunk," etc. Many letters were received at first to the effect that if the money thus appropriated were used to improve the service, it would be better spent. But with bi-monthly issues beginning on Feb. 5, 1916, it was not long until the droll humor of the green print and the antics of the tramway "pup" (Public Utility Problems), which mascots the publication in its precarious mission, had won a place in the routine life of the car riders. Now, Tram-O-Grams is not only read by the company patrons, but its periodic appearance is actually awaited. In popular favor, Tram-O-Grams is to Denver what B. L. T.'s column in the Chicago *Tribune* is to Chicago, but in addition, despite its humorous trend, it weaves the true knowledge of the tramway problems into the stories and the readers are educated as well as entertained.

### TRAM-O-GRAMS

While many of the policies embodied in the publication of Tram-O-Grams are not new, the ideas of the men responsible for its character are worthy of recitation. The big governing principles of course are laid out by F. W. Hild, general manager, the "Heap Big Chief," as the public knows him through Tram-O-Grams, while the editor of this paper is J. C. Davidson, publicity manager. The latter is blessed with the happy faculty of telling the public why the company is right when it seems to be wrong, and making everyone believe it and take it with a smile.

Pouring oil on troubled water was to be metaphorically the effect of the publicity which Tram-O-Grams was to set forth when it was decided that the breach between company and public was such that the former needed some more intimate contact with its patrons in order to disseminate information on the company's real problems and to foster a get-together spirit. The discussions in the paper were to be truthful and backed up by efficient service. It was realized that the company was permanently in the business of selling transportation, and that no advertising could be continuously successful unless the goods to be sold were exactly what they were represented to be. So every member of the company organization was instilled with the spirit of service, and the maximum of this commodity was to be the least that would be satisfactory. Consequently the publicity department was armed with the most powerful weapon available in the strife for public good favor, and could go ahead confidently to show how much, and not to cover up how little, service the company was supplying its patrons.

No "scrapping" back is tolerated in Tram-O-Grams, since its publishers believe this engenders antagonism to the company and disinterest in the paper. Sometimes the contents of letters to the company are made the



"STRAPHANGING NUMBER"

Tram-O-Grams

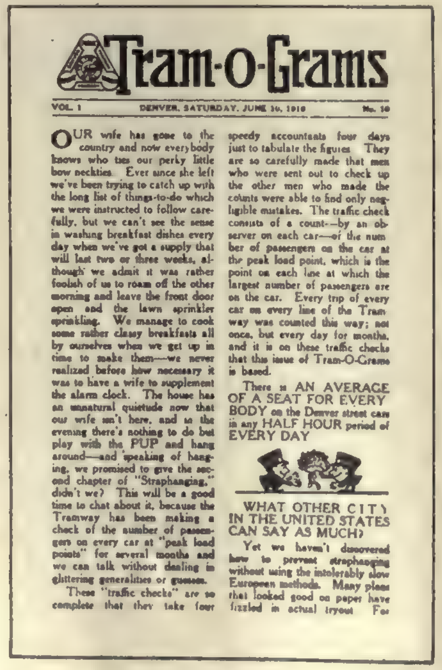
Vol. 1 DENVER, SATURDAY, APRIL 1, 1916 No. 8

FIRST, permit us to introduce the melancholy animal that is sitting on top of our starboard column of conversational chat about Denver's standing army. We call him PUP but his full name is

Public
Utility
Problems

which accounts for his being such a sad critter. In Tram-O-Grams we talk mostly about the problems of this particular public utility, so nothing could be more natural than to choose PUP, as representing Public Utility Problems, for Tram-O-Gram's mascot. While talking about this we wish to deny several times the insinuation of the lady who telephoned us to say that our PUP would be the better for a good scrubbing. PUP has white hair with black spots, and the car cleaning crews run the vacuum cleaner over him once a week, so he is sure to be perfectly clean. If we had a pet leopard we suppose this critic of ours would want us to buy some erasers and rub out his spots.

The problem that gives PUP his perplexed air today is one that got us all fussed up a few weeks ago and when we went out to City Park yesterday it was brought to our attention again, for the car was full and we had to stand up, and suddenly the motorman rang the gong, dropped the fender, turned off the power, applied the emergency brakes and cussed all in the same breath as a black touring car flashed across the tracks two inches in front of the fender, and Hudson Maxim was right about lack of preparedness, for we fell into what was left of a fat man's lap and he wanted to know if this was a jitney bus. And inasmuch as we had poked the man next to him in the course of our long and angular descent, this man felt that he had the right to mildly protest by asking if the particular strap assigned to us had broken, which drew our attention to the people standing up in the car. Now, why couldn't they all have seats? Why didn't the Tramway give its whadyecallit editor a seat so that he wouldn't have to wander around on fat parties against his will and perhaps against other people's? And then we remembered that we had made an investigation of this straphanging problem and had promised to tell you about it. Here's where we unload



Tram-O-Grams

VOL. 1 DENVER, SATURDAY, JUNE 24, 1916 No. 10

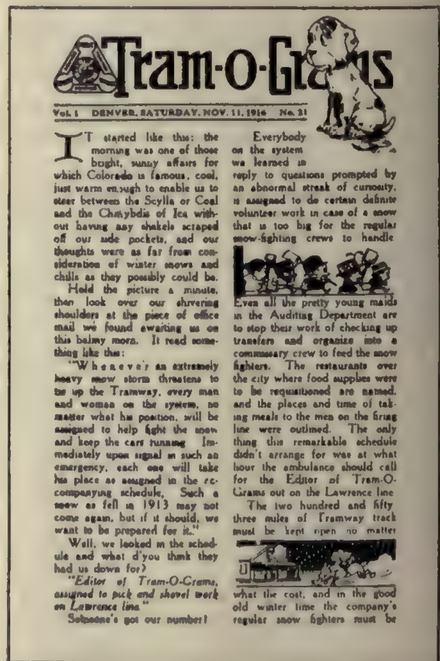
OUR wife has gone to the country and now everybody knows who ties our perky little bow neckties. Ever since she left we've been trying to catch up with the long list of things-to-do which we were instructed to follow carefully, but we can't see the sense in washing breakfast dishes every day when we've got a supply that will last two or three weeks, although we admit it was rather foolish of us to roam off the other morning and leave the front door open and the lawn sprinkler sprinkling. We manage to cook some rather classy breakfasts all by ourselves when we get up in time to make them—we never realized before how necessary it was to have a wife to supplement the alarm clock. The house has an unnatural quietude now that our wife isn't here, and in the evening there's nothing to do but play with the PUP and hang around—and speaking of hanging, we promised to give the second chapter of "Straphanging," didn't we? This will be a good time to chat about it, because the Tramway has been making a check of the number of passengers on every car at "peak load points" for several months and we can talk without dealing in glittering generalities or guesses.

These "traffic checks" are so complete that they take four speedy accountants four days just to tabulate the figures. They are so carefully made that men who were sent out to check up the other men who made the counts were able to find only negligible mistakes. The traffic check consists of a count—by an observer on each car—of the number of passengers on the car at the peak load point, which is the point on each line at which the largest number of passengers are on the car. Every trip of every car on every line of the Tramway was counted this way; not once, but every day for months, and it is on these traffic checks that this issue of Tram-O-Grams is based.

There is AN AVERAGE OF A SEAT FOR EVERY BODY on the Denver street cars in any HALF HOUR period of EVERY DAY

WHAT OTHER CITY IN THE UNITED STATES CAN SAY AS MUCH?

Yet we haven't discovered how to prevent straphanging without using the intolerably slow European methods. Many plans that looked good on paper have fizzled in actual tryout. For



Tram-O-Grams

Vol. 1 DENVER, SATURDAY, NOV. 11, 1916 No. 21

IT started like this: the morning was one of those bright, sunny affairs for which Colorado is famous, cool, just warm enough to enable us to steer between the Scylla or Coal and the Charybdis of Ice without having any shekels scraped off our side pockets, and our thoughts were as far from consideration of winter snows and chills as they possibly could be.

Hold the picture a minute, then look over our shivering shoulders at the piece of office mail we found awaiting us on this balmy morn. It read something like this:

"Whenever an extremely heavy snow storm threatens to tie up the Tramway, every man and woman on the system, no matter what his position, will be assigned to help fight the snow and keep the cars running. Immediately upon signal in such an emergency, each one will take his place as assigned in the accompanying schedule. Such a snow as fell in 1913 may not come again, but if it should, we want to be prepared for it."

Well, we looked in the schedule and what d'you think they had us down for?

*"Editor of Tram-O-Grams, assigned to pick and shovel work on Lawrence line."*

Someone's got our number!

Everybody on the system we learned in reply to questions prompted by an abnormal streak of curiosity, is assigned to do certain definite volunteer work in case of a snow that is too big for the regular snow-fighting crews to handle.

Even all the pretty young maids in the Auditing Department are to stop their work of checking up transfers and organize into a commissary crew to feed the snow fighters. The restaurants over the city where food supplies were to be requisitioned are named, and the places and time of taking meals to the men on the firing line were outlined. The only thing this remarkable schedule didn't arrange for was at what hour the ambulance should call for the Editor of Tram-O-Grams out on the Lawrence line.

The two hundred and fifty three miles of Tramway track must be kept open no matter what the cost, and in the good old winter time the company's regular snow fighters must be

GENERAL IDEA OF THE STYLE AND APPEARANCE OF THE DENVER PUBLICITY LEAFLET theme for a lesson story, but the letters are never quoted and the names of the writers never mentioned. No advertising is carried in the little two or four-page paper, for the reason that it was the aim to concentrate full attention on the stories the company had to tell. Another of the policies which has helped most to establish the company organ in the confidence of its patrons is the admission of a fault when there is one, and then the prompt action to correct this. Even in so large a matter as the charge that a number of cars of safe and serviceable character but much smaller than the present standard ought to be discarded, the company graciously acknowledged through Tram-O-Grams the truth of the charge, and then explained why these cars could not be dispensed with at the moment, but it gave assurance that they would be later on. This was after the cars had been dubbed "Hildidink" cars to "honor" the g.m.

THE TRAMWAY BULLETIN

Vol. IX No. 4 Shop Number January, 1917

COVER OF ONE ISSUE OF THE TRAMWAY BULLETIN

The subjects treated in this company public organ cover all manner of topics, from discussions of "our wife" and the "assistant editor" (Mr. Davidson, Jr., eight months old) to straphanging, tramway history, municipal ownership, painting and cleaning tramway cars, putting the vent in ventilator, etc. But no matter how far removed from street railways a story may seem to be in opening, before the reader knows it he is thinking about and interested in something about the tramway company. Naturally, improvements in the service are featured, and then there is much information as to car service, owl-car schedules, transfer privileges, etc., that is of personal value to the riders. One of the features which helps to make the paper readable and lively is the interpolation of small cartoons, which with humorous exaggeration visualize and drive home the point being made.

### DISTRIBUTION OF TRAM-O-GRAMS

Fifty thousand copies of Tram-O-Grams are printed to serve the 250,000 population of Denver, which pays 150,000 cash fares a day to the tramway company. These 50,000 copies have been carefully estimated to have 150,000 readers, because of the number left on the cars and reread and the number taken away which are found in offices and homes and read by the wives and young people. On Saturday morning, twice a month, the paper is issued and the conductors distribute copies to the passengers on all inbound cars. At first the edition was divided 150 to a car, but this was soon found to be unsatisfactory, and accurate traffic figures for each run were made the basis of the number supplied to each car. For instance, a certain car and trailer made so many trips and carried a total of so many passengers. This number divided by two was determined as the proper number to assign to that run to realize the maximum value. After the first day, the remaining copies are placed in the "take one" box, and they usually disappear in a few days. Any left over are taken out of the boxes. These were formerly distributed in automobiles, barber shops, etc., but now with only 1000 or 1500 left over they are put in boxes at the interurban and central loops in the downtown district where five and sixteen car lines respectively turn back, and the left-overs disappear without the need to throw any away.

Latest photo of the Shop Editorial Board in the trenches. Grover Woolums, N. C. Harvey and Harry Newberry, who are responsible for the meaty contents of this issue of The Bulletin. The hammer is simply a gentle hint of what may happen to anyone who doesn't agree that this is the best number ever published.

**EDITORIAL BOARD FOR FEBRUARY**

**SPLIT MEN**

**N. R. Rogen, South Division**
**W. C. McFarlane, Central Division**
**J. J. Hammil, North Division**
**J. C. Cash, East Division**

PHOTOGRAPH OF EDITORIAL BOARD FOR THE SHOP NUMBER AS IT APPEARED IN THE BULLETIN

Evidences of the appreciation and popularity of Tram-O-Grams have been constantly forthcoming. On one occasion the printer was late in getting out the issue, and almost every conductor, as he came to his division headquarters, anxiously inquired where in the world Tram-O-Grams was, and asked that it be hurried up so he could keep his passengers quiet. All during that day, after the papers had appeared about three hours late, there was excellent evidence of the demand. Other indications of the interest in the paper are afforded in the fact that as high as 10,000 replies to contests have been received.

All in all, this little publication is considered by the company to be the best and at the same time the cheapest publicity it can get. In the year and three months

Tram-O-Grams has been published relations of the public toward the company have changed from antagonistic to reasonable to favorable. And why? There is only one answer, simple as it is. The company has been frank, honest, open to criticism, ready to admit deficiencies when they existed and willing to improve conditions when within its power, and it has educated the public through intelligent publicity to understand and appreciate its situation. Confidence has been gained that the best service possible is being given, or if not that the company is ready to go more than half way to meet the public in any request. So, as is always the case where this formula for public friendship is applied, the complaints have turned mostly to suggestions, many of which are of real merit.

### THE COMPANY-EMPLOYEE PUBLICITY

So much for the company-public publicity, but that is not all the publicity manager has to keep him away from the ball game, with an annual pass in his pocket. Besides Tram-O-Grams, there is the Tramway Bulletin, a 9-in. x 12-in. magazine issued monthly for the 1500 to 1700 company employees. This is a magazine edited by the company employees and the editor and is made to be the gossip and news among the employees and not talk "at" them. If the company has any orders or instructions to issue to the men, these are delivered usually by word of mouth, or through the bulletin boards. In other words, the Tramway Bulletin is not the official mouthpiece of the management to the employees, but is rather the "keep-acquainted" organ of the employees themselves, a magazine of the employees for the employees, a medium for the dissemination of information and the discussion of any subject of particular interest to the employees, but not a place to "air" personalities of course.

The unique feature of this paper is the scheme the publicity manager has for getting the employees themselves to write the paper. At each of the four divisions of the company there is a local social and athletic club. The presidents of these clubs appoint, or the club elects a man to represent it on an editorial board one month to get out the paper for the next month. This editorial board is rotated through the different departments of the company, appointments being made in other than the transportation department by the head of the department. When the names of the men elected or appointed to serve on the board for the next month are received by the editor, letters are addressed to them acknowledging their appointment and asking them to meet at a certain time for a conference with the editor. In the meantime they are asked to be thinking over possible subjects for articles, or to bring up subjects which may have been suggested by trainmen in club meetings, etc. They meet and talk over the issue from cover design to make-up and feature articles, and then who they can get to write the stories. With this decided, the editor puts it up to these men to induce their fellow employees to write the stories suggested.

As the final decision on the subjects to be treated is left to this editorial board, although it may be assisted by the editor, its members recognize their responsibility for the issue and their suggestions are then numerous and free. This group of four or five men actually do supply a good share of the material for their issue, even the shop mechanics. As a reward, the photographs of the editorial board for that issue are run each month, and the names of the men on the editorial board for the next month are printed.

By this scheme, the request to write something comes from one trainman to another, or from one shopman to another, and it is accorded a much different reception than would be the case if the superintendent or master mechanic or editor asked him to do it. This way he knows he doesn't have to do it, but he does it out of interest. By having them do the writing, the bulletin gives the viewpoint of the men in the ranks and supplies them with the kind of reading matter they want. The editor does not know and could not have this close knowledge unless he worked with them.

Once in a while an employee contributes something for publication which would reflect discredit on the company unjustly. If the editor cannot show him why it is wrong and why it should not be published, the matter is put up to the author's department head and finally to the general manager. If he still persists, the article is published, and with it a statement of the company's position, dependence being placed on the employees' sense of fairness to take the matter properly. In this, as in any other intra-company matter, Mr. Hild is perfectly willing at any time to put the matter up to the employees, since he has absolute confidence that their decision will be fair, if they have all the facts. If an employee wants to contribute something that the officials had rather not see in print, and he is right and insists, it is printed and the company takes its medicine. These are the policies which have made the magazine truly an employee's paper and have helped to bring about most amicable relations between company and employees.

It is the aim to publish everything sent in by the men, and the contributors are assured that their stories will be corrected as to grammar, spelling, punctuation, etc., but otherwise unaltered, so that they may tell their story without fear of being laughed at for lack of knowledge of writing. Like Tram-O-Grams, the Bulletin is enlivened by small cartoons and also by numerous halftone cuts, and the reading matter is made as interesting and full of human interest and as vital to the employees as possible. Some advertisements are carried, principally local, but in keeping with the better thought of the times, advertising from companies selling equipment or material to the tramway company is being eliminated.

The personal items receive a good deal of space in the paper, for what employee does not delight at knowing what his friends are doing and live in anticipation of seeing his own name in print. These personals are supplied to the editor by a novel process, created for the purpose. One of the old trainmen, who knows the property like a book and most of the employees by their "front" names, was given the title of chief conductor, with duties to spend the forenoon of each day in riding the cars, especially those operated by the newer men, to assist them and diplomatically show them how to do better work. Then in the afternoon he comes into the editor's office full of news and gossip and acts as assistant editor and contributes his morning's "tid bits" to the personal and news columns of the Bulletin. This arrangement gives the editor a valuable reporter, with only half his time charged against the publicity department.

Thus the company magazine has a real place in the life of the employees and helps to bind them into a brotherhood and to lend interest and contentment to their work. In these respects it is very similar in its mission to Tram-O-Grams, for this is designed to bring out the community of interest in the street railway which exists between the public and the company, and to bind the whole population into a corps of enlightened citizens which knows something of the ins and outs, the ups and downs of the tramway business, and which would never tolerate any legislation to the detriment of the tramway company and hence to the transportation service.

## Chicago Anti-Parking Ordinance Proves Effective Relief

### Average of 3.7 Minutes Per Car Saved in Loop District During Maximum Half Hour and 2.2 Minutes Per Car During Full Peak Period, 4 to 7 P. M.

CHICAGO'S anti-parking ordinance which prohibits the parking of automobiles and other vehicles on any of the car line streets in the downtown loop during the hours of 7 to 10 a. m. and 4 to 7 p. m., became effective on May 1. Until recently no figures were available to show just how much saving in time was made to the Surface Line cars as the result of clearing the streets of standing machines. However, excerpts from a report submitted to the commissioner of public service, John P. Garner, and thence to the City Council, covering a traffic check made under the direction of T. E. Flanigan, acting transportation supervisor for the city, give a good approximation of the time saving and schedule improvements effected. Not enough men were available to make a complete check, but the figures published herewith are claimed to represent approximately 85 per cent of the total street-car traffic:

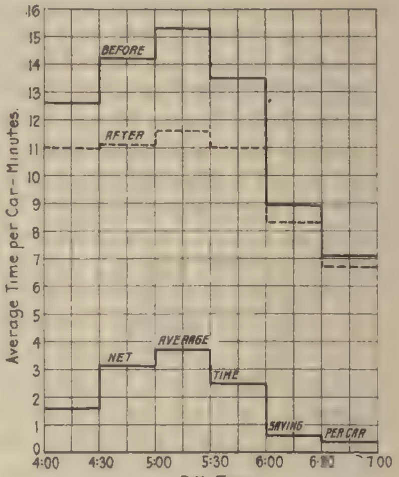
TRAFFIC CHECK BEFORE AND AFTER EXISTENCE OF ANTI-PARKING ORDINANCE

| Half Hour Period | No. Cars Entering Loop | No. of Minutes Before | No. of Minutes After | Time Saving, Minutes | Average Minutes Per Car, Before | Average Minutes Per Car, After | Average Saving Per Car, Minutes |
|---|---|---|---|---|---|---|---|
| 4:00 to 4:30 | 329 | 4,138.2 | 3,625.2 | 513.0 | 12.6 | 11.0 | 1.6 |
| 4:30 to 5:00 | 395 | 5,601.3 | 4,390.5 | 1,210.8 | 14.2 | 11.1 | 3.1 |
| 5:00 to 5:30 | 498 | 7,600.9 | 5,750.4 | 1,850.5 | 15.2 | 11.5 | 3.7 |
| 5:30 to 6:00 | 436 | 5,868.7 | 4,777.4 | 1,091.3 | 13.5 | 11.0 | 2.5 |
| 6:00 to 6:30 | 333 | 2,980.8 | 2,712.5 | 268.3 | 8.9 | 8.1 | .8 |
| 6:30 to 7:00 | 268 | 1,913.8 | 1,828.2 | 85.6 | 7.1 | 6.8 | .3 |
| Total....... | 2,259 | 28,103.7 | 23.084.2 | 5.019.5 | 12.4 | 10.2 | 2.2 |

The figures above were derived from a check made the fourth day after the ordinance became effective—May 4. At this time vehicle owners and drivers had not become thoroughly acquainted with the provisions of the ordinance, and its operation had no doubt not reached maximum efficiency. It is quite possible that a check made at the present time would show a slight increase in the time saved above that shown in the table.

The greatest individual line time saving was effected on Wabash Avenue and on State Street. During the half hour of maximum traffic, the average time for loop terminal cars to proceed north on Wabash Avenue from Van Buren Street to Washington Street and return was reduced 8.4 minutes. The average time of through routes No. 1 and No. 3 cars, northbound on Wabash Avenue from Van Buren Street to Lake Street and thence west to State and Lake Streets, was reduced eight minutes. Only a slight saving was made by southbound through routes No. 1 and No. 3 cars. This is an indication that the loop cars on Wabash Avenue, which enter the district practically empty from 5 to 5.30 p. m. and load very few if any passengers northbound between Van Buren and Washington Streets, were being compelled to creep along on the northbound track between these points principally because of the congestion caused by automobile parking. Similar conditions prevailed on State Street where the average time of loop cars from Van Buren Street north to the far side of the loop and return was reduced eight minutes, while the average time of northbound through route No. 6 cars, from Van Buren to Lake Streets, was reduced 8.2 minutes.

In general, a tremendous amount of time in the total is saved for the car riders through the benefits of this anti-parking ordinance. The time necessary for automobiles and other vehicles as well as street cars to move from point to point within the loop district has been materially decreased. Congestion along all streets between intersections has been greatly reduced, and there has also been a marked improvement in the movement of street cars, vehicles and pedestrians at intersections. This improvement, of course, lends itself to a more even distribution of load on the street cars. The facilitating of all traffic within the 2.5-square-mile district affected by the ordinance can reasonably be assumed to reduce the liability of accidents of all kinds.



GRAPHIC PICTURE OF CHICAGO TRAFFIC IMPROVEMENT

As the result of this new ordinance, many automobile owners were summoned to court for violating the anti-parking feature. During May, 1917, the number of cases disposed of in the automobile court was 4090, as compared with 2720 cases in April, 1917, and 2067 in May, 1916. The large increase in the number for May, this year, is almost entirely attributable to the anti-parking ordinance under which arrests were made from the first day. No particular difficulty, however, was encountered in establishing the new traffic regulation.

The New York papers a few days ago had a good deal of fun with the farewell appearance of the horse car in that city. The last car had been operated on a short downtown line. In 1916 it carried 3576 cash passengers and 1945 transfer passengers, with total receipts of $178.80. Last year it cost the New York Railways Company more than $1.50 to carry each passenger, and on July 17, 1917, the total receipts were 10 cents.

# Lima, Peru, Has Enterprising Electric Railway System

## Special Equipment Has Been Constructed in Company's Shop to Meet Local Needs

BY PHILIP S. SMITH
Special Agent United States Department of Commerce

THE electric railway system of Lima, Peru, is now generally conceded to be one of the best in South America. It is operated by the Empresas Electricas Asociadas, a company formed by the combination of the former lighting company and three electric railway companies. One of the railways operated cars in Lima, another between Lima and Callao, 9 miles, and the third between Lima and Chorillos, about 8 miles. The old English line between Callao and Chorillos, via Lima, is operated by the Empresas as a freight road. These lines as well as the several local extensions in the suburbs of Lima, having in all some 75 miles of single track, 135 passenger cars and six electric locomotives, are under the charge of Arthur H. Mann, resident engineer. Previous to taking up this work Mr. Mann was general superintendent of the Jersey Central Traction Company, Keyport, N. J.

### Some Recent Large Shop Jobs

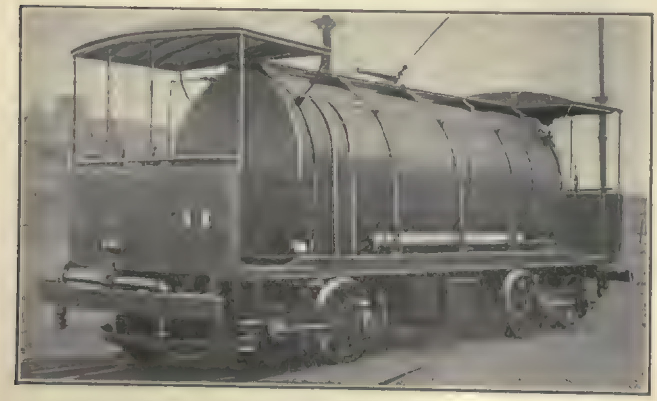
It is impossible to obtain good mechanics in the local labor market and so it has been necessary for the company to train its own employees for the various classes of work which have to be done. In this way the mechanical staff of the "factoria," or carhouse, has been trained to the point where it makes all repairs, including machine work, carpentry, casting and coil winding. One of the jobs recently completed consisted in sawing an eight-window car which had been damaged in an accident, into four two-window sections and inserting them into four other cars of similar type, thus materially increasing their capacity. The construction of complete new cars has also been undertaken successfully, two examples being shown in the accompanying illustrations.

INSTRUCTION CAR USED IN LIMA, PERU, SHOPS

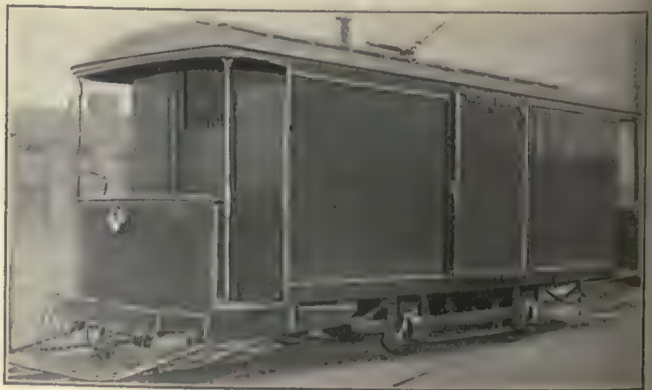
According to the franchise under which the company operates it is obliged to sprinkle all of the streets through which its cars run. In order economically to perform this service on the long interurban lines it was necessary to construct a car having twice the capacity of the small cars used in the city itself. One of the illustrations shows the completed car which is built of steel throughout. The frame is made of four 8-in. I-beams, connected to cross beams in five places by angles. The car itself is 30 ft. long and is mounted on McGuire trucks equipped with two GE-80 motors. The tank is constructed of boiler plate and is secured to the car frame by five holding-down straps. At one end a compartment has been formed by putting in a false head about 2 ft. from the end, and this serves as a storage reservoir for the air, which is maintained at a pressure of 90 lb. per square inch by means of a Westinghouse No. 3 compressor. A hand-operated valve, placed between the tank and the air reservoir, can be closed, thus retaining the pressure while the tank is open for refilling. The sprays are independent and can be operated from either end of the car through dashboard levers and quick opening valves. With full air pressure the spray on one side can be thrown 60 ft. A separate National Brake & Electric Company AA-1 compressor is used for the brakes.

The franchise also calls for the free transportation of meat from the abattoir to the Central Plaza, or market place, and the car shown in the illustration below was built to replace the two old cars formerly used for this purpose. It has a capacity of twenty-four sides of beef and is well braced to provide against sagging on account of the wide center doors.

The unusual fenders on these cars are the design of Mr. Mann and are being used also on several of the regular cars. When in the operating position they are pulled forward and the apron is tipped back and hooked to the bumper. The iron braces drop into slots at each side, thus holding firmly until no longer required, when they are lifted out, the apron is dropped down and the whole fender is pushed under the car, clearing both coupler and bumper. It is shown in the latter position on the rear end of the car.



LARGE CAPACITY SPRINKLER CAR FOR USE IN VICINITY OF LIMA, PERU



MEAT CAR BUILT IN SHOPS OF ELECTRIC RAILWAY SYSTEM OF LIMA, PERU

To assist in teaching conductors and motormen an instruction car has been designed and installed as shown in the third picture. A car frame with two GE-54 motors is mounted on rollers permitting the wheels to revolve when power is applied. Blueprinted diagrams of the wiring arrangement of a two-motor car and of a four-motor car is attached to the framework of the side of the car, and on them all motors, resistances and controller connections are clearly shown. The motors are represented by groups of five lamps and the resistances by as many lamps as there are resistance points on the controller. The latter lamps are so connected that they are cut out one by one as the controller is notched up and the increased voltage on the remaining lamps causes them to burn brighter progressively, thus giving a visual understanding of the heating to which the resistances are subjected if the car is run with the controller on any of the resistance points. The air-compressor governor and rheostats are mounted above the car floor to facilitate the demonstration of the working details, and the other devices which have to be manipulated during the running of the car, such as signal lights and trolley, are installed as in the actual car.

The training of all men is the same so that motormen and conductors are practically interchangeable. It consists of instruction in running a car until proficient, two weeks in the pit, a day or two on the instruction car with a teacher and then another week in the pit. At the end of this time an examination is given by the master mechanic and if passed the student is put on a regular run, but if not he is kept in the shops and given another period of training and examination. The result of this thoroughness is that, although the raw material is not all that could be desired, the corps of operators so trained is reasonably competent and satisfactory.

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# The Human Nature of Publicity

## Managers of Electric Railway Properties Should Study the Psychology of Publicity—Helpful Suggestions Are Given on the Way to Present the Facts Most Convincingly to the Public

By IVY L. LEE

ELECTRIC railway men can be classified roughly into four categories:

1. Those who believe that the public has no right to see what goes on inside their business, and therefore have no use for publicity.

2. Those who have no particular objection to publicity but think that, no matter what they might do, the public would not be in the least more favorably inclined in its attitude toward the business.

3. Those who believe the idea of publicity is a good thing but do not believe the public cares to know what their company is doing.

4. Those who believe in the public and are making great progress toward a better relationship between that public and their business.

With reference to the first class, I do not doubt but that the logic of events will be more than persuasive. The people now rule. In place of the divine right of kings, we have substituted the divine right of the multitude. The crowd is enthroned. This new sovereign has his courtiers, who flatter and caress precisely as did those who surrounded medieval emperors. These courtiers are sedulously cultivating the doctrine that to be weak is to be good and that to be strong is to be bad. The demagog is abroad in the land, and there are omens that cannot be disregarded.

One of the main reasons why the electric railway is not understood by the public is that electric railway managers have failed to take account of certain fundamental currents of human nature, which, from time immemorial, have been made most of by men who have influenced the action of crowds. Electric railway men have been standing aside content to be judged by the machines they were running, not attempting to have themselves regarded as human beings, not making it known that electric railways were but composites of human nature. Machines haven't the necessary red blood to draw multitudes.

I know that 999 men out of 1000 in the electric railway business are doing their work as well, if not better, than 999 men out of 1000 in other occupations. The electric railway business as a whole is to-day conducted as honestly and as efficiently as any other business in the world.

Why is it then that the good in electric railways has not always been appreciated? Why is it that the public immediately rises up in arms at the mere thought of an increase in fares? It is because electric railway men have neglected the human nature of the situation; it is because loud-tongued politicians have let their imaginations run rampant for the benefit of the multitude while electric railway men sat still, attended to their jobs and said nothing about what they were doing or of the difficulties they had to meet.

From the beginning of history, popular leaders have taken account of the fact that the people in the mass act upon impulses. Such leaders have not been disposed to exaggerate the influence of reason in determining the acts of mankind at large. If electric railway men then are to assume the place to which they are entitled as leaders of the public, they must consider these same elements in the psychology of the multitude.

### MAINSPRINGS OF CROWD STIMULATION

These elements may be briefly described as follows:

1. In the first place, crowds do not reason—they proceed on impulses. It is impossible to induce a crowd to proceed toward any proposition on strictly logical premises. John C. Calhoun proved beyond dispute, as a matter of pure reasoning, that the Southern states had a right to secede, but Wendell Phillips came along and preached the doctrine that the slaves should be freed

and that the Union must be preserved. It would have been a logical thing to pay the Southern people for their slaves, but we all know that it was not possible to deal with the problem in that way. The dealing was with crowds.

2. Again, crowds are led by symbols and phrases. Joseph Chamberlain, when he was advocating the Boer War, achieved his purpose when he dubbed those opposed to him as "Little Englanders." We know that Bryan through the creation of that extraordinary phrase, "You shall not crucify mankind on a cross of gold," did more to advance the free silver cause than all of the other subtle and logical efforts that were ever made to advocate that idea.

3. Success in dealing with crowds, that success which we must attain if we are to solve the railway question, rests upon the art of getting believed in. Does anyone question that Mr. Roosevelt's supreme influence while he was President was due to the fact that the American people absolutely believed in him, believed in the purity of his motives and the elevation of his patriotism? Believing in him as they did, they paid no attention to his blunders or to criticisms of him.

4. The problem of influencing the people *en masse* is that of providing leaders who can fertilize the imagination and organize the will of crowds. Moses painted a picture of the Promised Land, and he induced the Israelites to spend forty years of extraordinary hardship under his leadership. Cæsar drew a picture of the conquest of Gaul and so infused the imagination of the Roman populace that they thrice offered him a crown. Napoleon's uncanny power in France was due to his resourcefulness in the appeal to these same elementary crowd-impulses.

These are some of the mainsprings of crowd stimulation. They are factors which statesmen, preachers and soldiers have from time immemorial recognized when they sought to lead peoples. My point is that in working out the electric railway problem we must take account of these same principles of crowd psychology.

### Be Careful of the Terms Used

We can never be too careful in the terms we use. Some time ago, a certain public service corporation was in great financial difficulties; it could not pay its bond interest. Its president induced its bondholders to agree to a reduction of the rate of interest on the bonds. The president then announced to the public that there was to be "a readjustment" of the finances of the company. Now "readjustment of finances" sounded so much better than saying "Your company is bankrupt," and no one ever suggested that his company was bankrupt. It was a matter of terms.

There is often talk of "educating the public." Electric railway officers themselves are getting a good deal of very helpful "education." It is not a question of "educating the public," it is a very real question for the electric railway man of understanding the public and having the public understand him.

What we say to the public, it seems to me, must be with reference to the effect it will make and not primarily with reference to its logical sequence. You cannot argue with the public. It wants facts; not generalizations.

Again, I would suggest that there is no gain in pointing out the logical inconsistencies of other people's statements or arguments, however erroneous they may be. If we cannot answer what they say with something that will appeal constructively to the imagination or emotion of the public, with something which will supplant the erroneous statements, it is hardly worth while to go into the case at all. We may say what has been said of man, that "a crowd convinced against its will is of the same opinion still."

A public to be influenced must feel. Too many railway announcements are full of cold legal phraseology; they leave the public unmoved.

To make the public feel we must be concrete; we must tell of our work in language the layman can understand. He will not analyze figures. What he wants to know is, are you doing the best you can? Convince him of that and you don't need to argue details.

We should see to it that in all matters the public learns the truth, but we should take special pains to emphasize those facts which show that we are doing our job as best we can and will create the idea that we should be believed in. We must get so many good facts, so many illuminating facts, before the people that they will not magnify the few bad facts. There will always be some bad facts in every business, as long as human nature is frail.

### Don't Neglect Human Nature

Do not misunderstand me. Nothing is further from my thoughts than to suggest any attempt to prove things are good which are really bad. No one should condone the bad, and it should be, as I believe it is, the constant aim of nearly every electric railway man to make things better. What I do mean is that we should not neglect the human nature of the situation but should make the most of it; that we should tell our story, tell it frankly, tell it fully, and tell it with a view to its being understood and carrying conviction as to the essential truth.

Unless the electric railway men of the country are to be believed in, so that the public will take their advice as to what it should do with reference to electric railways, we are not going to make very much headway in the settlement of our railway problem.

The crowd craves leadership. If it does not get intelligent leadership it is going to take fallacious leadership. We know that the leadership which the mob has often received, not only in this country but in other countries, unless corrected is liable to produce disastrous consequences. Is it not supremely worth while, therefore, that electric railway officers should take account of those fundamental undercurrents of human nature; take practical steps to obtain the confidence of the public and assume the leadership which by right of character and ability they are entitled to exercise?

Men utilize skill to produce emotion and opinion in favor of reform and against the wrong. Why should not the same process be utilized on behalf of constructive undertakings, on behalf of ideas and principles which do not tear down but really build up?

Is it not indeed likely, not only in electric railroading but in all industrial lines, not alone in this country but in all Western nations, where the same problems are pressing, that it will be by men of intelligence and ability, directing through such methods as these the great movements of the people along lines of health and greatness, that ours may be saved that decadent phase which no civilization has yet escaped?

# Experience in Weed Burning on Pacific Electric Railway

### At a Cost of $6 per Mile per Treatment This Company Wages a Successful Warfare Against the Weed Pest

BY CLIFFORD A. ELLIOTT
Cost Engineer Maintenance of Way Department, Pacific Electric Railway, Los Angeles, Cal.

CLIMATIC conditions in southern California render the abating of the weed nuisance a serious problem on the interurban lines of the Pacific Electric Railway. Success in this line involved the adoption of satisfactory methods for destroying the weeds and for keeping the track and right-of-way clear of them. The tedious hand method, involving constant pulling or cutting of weeds, is unsatisfactory. In southern California the mild climate gives the weed a continuous season for development. The heaviest rainfall occurs from December to March, during which period very little attention can be given to weeds. During the remaining nine months the work must be vigorously prosecuted.

WEED-BURNING OUTFIT USED ON PACIFIC ELECTRIC RAILWAY LINES

In fighting the weeds the company has for the last four years successfully used a burning outfit which was described in the issue of the ELECTRIC RAILWAY JOURNAL for June 28, 1913, page 1169. It comprises a train of four cars—the motor car, the oil-supply car, the water car, and the weed burner. The burner car contains, besides the burner, a boiler and water and fuel pumps. The oil is conveyed into a mixer, being forced through this to the burners as a combined crude oil and steam gas. Steel aprons and deflectors are provided on the sides of the burner to protect the car from damage and also to aid in the distribution of the flame. A light-grade crude oil is used in order to produce an intense heat.

During the first half year this machine was in service 628.4 miles of track were burned at an average cost of $5.12 per mile. The total costs, segregated into groups, were as follows:

| | |
|---|---|
| Work train service | $1,142.80 |
| Oil | 812.31 |
| Repairs, labor | 295.77 |
| Repairs, material | 112.00 |
| Track labor, following burner | 633.18 |
| Engineer and helper on burner | 223.11 |
| Total | $3,219.17 |

From June 1, 1913, to June 1, 1914, 1057.31 miles were burned, at an average cost of $5.37 per mile. From Feb. 1, 1916, to Jan. 1, 1917, 1637.64 miles of track were burned, at an average cost of $6.75 per mile. The increase in cost for 1916 over 1914 was due to increases in cost of labor, motor-car rental, and oil.

Owing to the frequency of service on the company's lines it is difficult to handle the weed-burner equipment on account of the numerous trips to sidings. On some lines the burning is done at night, but this is more expensive than daylight operation. The weed burner in use at present has a burning speed of from 4 to 6 m.p.h., but recent experiments in superheating the oil, gas and steam indicate that the speed can be increased to 15 m.p.h., with a resulting decrease in cost. Experiments with an improved burner are also being made which it is expected will lessen the amount of oil required.

Most of the company's lines are burned but twice a year, one at about 4 m.p.h., and again, after an interval of approximately ten days, at 8 m.p.h. Of course, conditions vary a great deal with the season and the location. On some lines there is heavy vegetation, comprising many varieties of weeds, and some seasons are dryer than others, so that the vegetation burns more readily. In a dry season, however, the expense for track gangs following the burner to eliminate fire hazard is greater. This precaution is necessary to protect the company's property and to prevent the flames from spreading to adjoining fields. In California, the most logical time for the first burning is after the first warm weather after the spring rains have terminated.

On the company's "close-in" lines, through thickly-settled districts, where the appearance of vegetation is objectionable, and there are strict municipal ordinances requiring the abating of the weed nuisance, it is the practice to burn twice a year. On more remote and less important lines, where appearance is not taken into consideration, one clearance a year is usually sufficient to keep the grass below the top of the rail so that wheels will not slide when the brakes are applied.

The water car, following the weed burner, is used to sprinkle the roadbed to extinguish the fires that may start in decayed ties, wooden culverts, cattle guards and trolley poles. A track gang follows the weed burner closely further to safeguard against fire hazard. Unless it is absolutely necessary, the burning is not done on right-of-way adjoining fields of ripe grain, but when it is done extra precautions are taken. Fortunately, most of the burning is done before the harvest season. Fruit trees are occasionally damaged near the right-of-way, especially where this is narrow, but damage claims in such cases have usually been very small.

Among the advantages of the burning method, as compared with the hand weeding previously used, the cost item is prominent. The average saving is about 65 per cent, and as high as $20,000 has been expended during nine months for this work by the old method. Again, the section forces can now devote their entire time to other items of track maintenance, the saving in labor being specially important in a time of shortage like the present. Further, the intense heat produced by the burner to some extent chars or sears the tops of the ties, tending to preserve them against the action of the elements. The burner also blackens the roadbed and track, eliminating glare, which is troublesome to the motormen and to some extent to the trainmen. This glare is particularly evident in rock-ballasted track.

The burning outfit which the company has been using was constructed in its own shops, under rights purchased from the inventor, E. E. Allen, and under his direction. These rights have now been taken over by the Wheelock Crude Oil Weed Burner Company of Los Angeles, Cal.

## Auto-Bus Interurban Feeders Unprofitable in Puget Sound Territory

### Washington Railway Interests Abandon Three Out of Four Routes When a Year's Trial Under Careful Management Shows Deficit Because of Sparse Population and Individual Competition

DURING the past two years the Puget Sound Traction, Light & Power Company has by means of a subsidiary organization, the Washington Auto Bus Company, furnished transportation to various communities not reached by its railway lines. This service as described in the ELECTRIC RAILWAY JOURNAL for Sept. 18, 1915 (convention issue) was inaugurated in order that the company might compile definite information on the cost of handling interurban traffic with autobuses and to see if good service could be maintained economically by this means.

After a year's experience with these buses a report from the subsidiary company states that it is still an open question whether it is better for a large corporation or a private individual to operate such bus lines. The large organization can buy at a slightly lower figure, but by far the largest item of cost in auto bus service depends primarily upon the individual driver and his care or abuse of the machine.

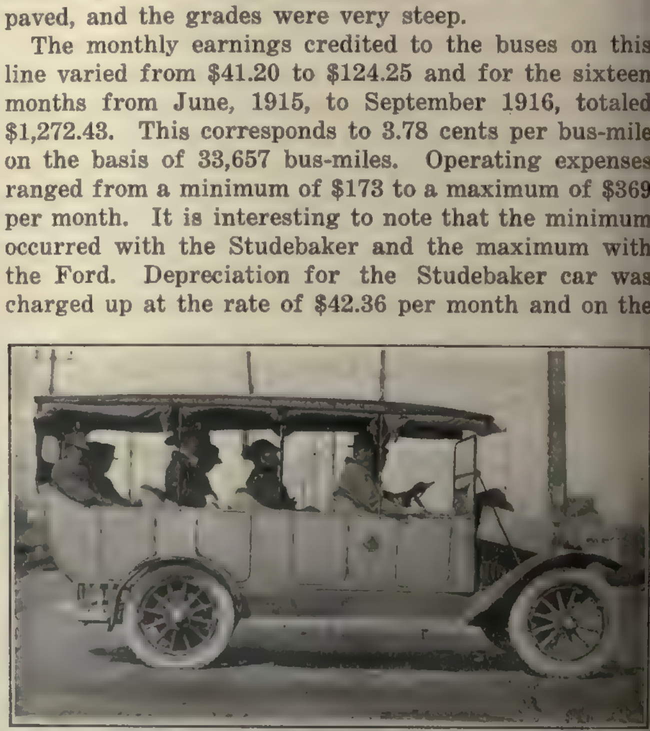
The questions of whether such service, in general, can be maintained economically by the large company is answered in the negative by the experience of the Seattle company. All four of the bus lines which were tried there accumulated a formidable deficit, and three have been abandoned as unsuccessful.

### OPERATING AND DEPRECIATION COST

Of the several routes with which the company experimented, the shortest one, 3 miles long, showed an operating and depreciation cost of 11.14 cents per bus-mile. This route connects Edmonds, a town of 1600 people on the shore of Puget Sound, with the Pacific Northwest Traction Company's line from Seattle to Everett. When this service was started there was already in operation an auto-bus line running direct from Seattle to Edmonds and the Great Northern Railway through service connecting Edmonds and Everett.

A four-cylinder, ¾-ton Studebaker truck, seating eight passengers, was put on this run in June, 1915. This truck was replaced in August by a Ford bus, which operated until Oct. 1, 1916. The route was unpaved, and the grades were very steep.

The monthly earnings credited to the buses on this line varied from $41.20 to $124.25 and for the sixteen months from June, 1915, to September 1916, totaled $1,272.43. This corresponds to 3.78 cents per bus-mile on the basis of 33,657 bus-miles. Operating expenses ranged from a minimum of $173 to a maximum of $369 per month. It is interesting to note that the minimum occurred with the Studebaker and the maximum with the Ford. Depreciation for the Studebaker car was charged up at the rate of $42.36 per month and on the Ford at the rate of $21.36 per month. Interest on the investment was respectively $5.45 and $2.68 per month.



STUDEBAKER CAR ON AUBURN-BUCKLEY AND PUYALLUP-ORTING LINE

On this basis it cost from $220 to $280 per month to operate the Studebaker and from $202 to $383 per month to operate the Ford. The net monthly returns ranged from a loss of $108, using the Ford, to a profit of $97 also made by the Ford. On this run the net result for the sixteen months' operation was a slight profit, amounting to about $295. The total distance covered in this time was 33,657 bus-miles. The operating expenses amounted to 9.94 cents per bus-mile and the depreciation to 1.20 cents per bus-mile, or a total of 11.14 cents per bus-mile.

### A ROUTE 20 MILES LONG

The bus line connecting the Seattle-Tacoma electric line at Auburn with Enumclaw and Buckley, two thriving little towns with a total population of 3000, was 21 miles long. The distance from Auburn to Enumclaw was 17 miles and Enumclaw to Buckley 4 miles.

When operation was commenced an irregular service had been maintained by private parties but without any relation to the schedule of the interurban trains. Although competitive fares were charged, the railway's buses secured a fair proportion of the business. The operation on this line was continued seventeen months. The route was unpaved at first and over very steep grades.

For the first six months two ¾-ton Studebaker trucks were used with specially built bodies arranged for eleven passengers. These were then replaced with ¾-ton White trucks with a seating capacity of twelve.

The total distance covered on this route was 130,134 bus-miles and the revenue was $12,839.61 or 9.86 cents per bus-mile. Operating expenses per bus-mile were 13.18 cents; depreciation, 1.76 cents, or an average total operating expense of 14.94 cents per bus-mile.

Monthly earnings varied from $661 to $1,177 and operating expenses ranged from $697 to $2,000. Depreciation for the seventeen months totaled $2,292 and interest on the investment $334. The net monthly earnings ranged from a loss of $1,364 to a profit of $172 and the net result from seventeen months of operation was a deficit of $4,524.

### No Nourishment on an Intake of 6.24 Cents per Bus-Mile

The Studebaker trucks taken from the Enumclaw-Buckley route were put on the 10-mile line connecting Orting with the interurban railway at Puyallup. This route was paved for its entire length and had no bad grades. Through bus service to Tacoma was already operating on this line, so that there was competition from the outset.

CAR ON BOTHELL LINE, INTERNATIONAL CHASSIS AND BRILL BODY

Operation was continued for eight months, during which time operating expenses were $6,557 and depreciation $995. These figures compared with the total earnings of $5,515 gave a deficit at the close of the period of operation of $2,136.

The total distance covered on this line was 59,879 bus-miles. Earnings averaged 6.24 cents per bus-mile, and operating expenses averaged 10.95 cents per bus-mile. As the depreciation was 1.59 cents, the total expense was 12.54 cents per bus-mile.

In the case of each of the three routes cited there was some form of auto-bus transportation already in the field. The new lines therefore had to meet competition from the start. It is believed that if the total available revenues from each route could have been taken in by one bus company there might have been sufficient business to make the venture profitable. However, there could be no profit with competition, it was pointed out. At present there is nothing to prevent a competing line from coming in—practically over night—and seriously injuring or destroying the business of the pioneer line.

### Line Earns 17 Cents but Costs 19.23 Cents per Bus-Mile

The bus line between Seattle and Bothell, 16 miles apart, has been operating since the latter part of 1915. At the outset there was considerable competition between rival lines, but by the end of 1916 competition ceased, and since that time the Washington Auto Bus Company has had all of the trade. This line was originally intended to connect Bothell with the interurban line running from Seattle to Everett, but on account of bad roads the routing of the buses was changed, and connections are made at the interurban depot in Seattle.

When operation was begun on this line three buses were put in service. These buses have a "street car" body, built by The J. G. Brill Company, mounted on an International Motor Company's 2-ton Mack truck chassis. The seating capacity is twenty passengers, with six non-reversing cross-seats, two longitudinal seats of two passengers each, and one four-passenger seat extending the width of the body in the rear. These buses were described on page 164 of the Electric Railway Journal for Jan. 22, 1916.

The passengers carried on this line average 450 to 500 per day in summer and from 300 to 350 in winter, the average fare being 20 cents. All of the route is paved. Revenue and expenses for the calendar year of 1916 are recorded as follows:

| | | |
|---|---|---|
| Total mileage covered | | 113,040 |
| Total receipts | | $19,213.29 |
| Operating expenses | $16,551.44 | |
| Depreciation, etc. | 5,193.30 | |
| Total expenses | | $21,744.74 |
| Deficit | | $2,531.45 |

On a bus-mile basis, receipts averaged 17 cents per bus-mile.

Total operating expenses (including depreciation), 19.23 cents per bus-mile.

Expenses per bus-mile, excluding depreciation, 14.64 cents.

The item of depreciation, which averaged $470 per month on the four buses, is based on an estimated three-year life for the cars. A recent check of this estimated depreciation shows that the charge is too high and that there will still be considerable value in the buses at the end of that period. At present the Bothell line is operating under favorable conditions and within the next few months it is expected that the accumulated deficit will be wiped out. All of the Bothell buses were overhauled in January, 1917.

The change in depreciation estimate on the Bothell line is not to be taken as probably also affecting the other three lines mentioned. In fact, it is now believed that the allowance made for depreciation on the three other bus lines was too low and that the exact figures for the operating expenses would show an even greater deficit for those lines than the figures given.

## Traction Line to Aviation Field Completed

The Kankakee & Urbana Traction Company, Urbana, Ill., has completed a switch ½ miles in length running into the United States Aviation Instruction Field at Rantoul, Ill., 14 miles north of Urbana. The aviation field consists of a plot of land 1 mile square, which has been stripped of all buildings and fences, graded and leased to the Government for a period of from one to five years, with a privilege to the Government of purchasing the land at the expiration of the lease. The aviation field is served by both the Kankakee & Urbana Traction Company and the Illinois Central Railroad and is supplied with water, sewers and electric lights from the village of Rantoul.

# The Mounting Costs of Railway Operation

## Beaver Valley Traction Company Uses Graphics Liberally to Indicate the Upward Progress of These Costs

A REPRESENTATIVE of the ELECTRIC RAILWAY JOURNAL, calling recently at the office of W. H. Boyce, superintendent of the Beaver Valley Traction Company, New Brighton, Pa., noted a comprehensive set of charts which had been prepared to illustrate the superintendent's annual report. As the charts showed clearly the way in which costs have, on the whole, been rising during the last ten years, permission to reproduce some of them for the benefit of the readers of the JOURNAL was asked and granted. The accompanying illustrations are the result.

The charts are especially designed to show the percentage of the gross revenue and total operating expenses represented by the several items selected for illustration. Fig. 1, the most impressive of all, indicates an increase in ten years of about 14 per cent in the ratio of operating expenses and taxes to gross revenue in the face of a substantial increase in gross. This percentage excludes consideration of the year 1915, when the company had an exceptionally high accident account. This fact is indicated in Fig. 2, which shows also a similar condition in 1909.

The remainder of the charts were selected to show the percentage increases in cost in the four equipment departments, incidentally bringing out the magnitudes of these costs also.

The horizontal scale in each chart represents the fiscal years of the company, which end on March 31, and the

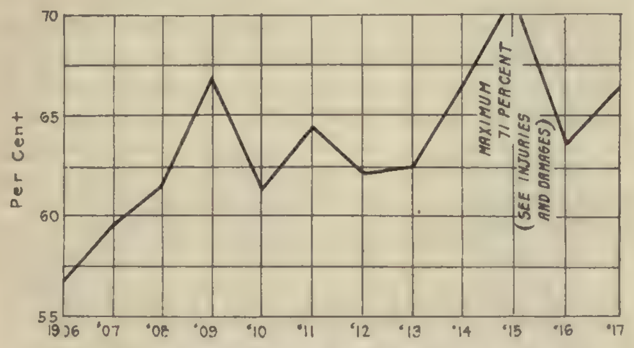


Fig. 1—Operating Expenses and Taxes, in Per Cent of Gross Revenue

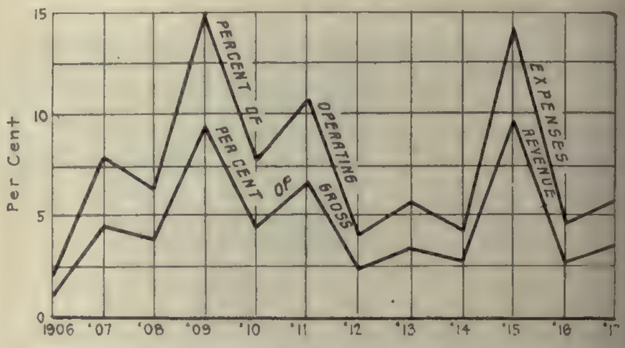


Fig. 2—Cost of Injuries and Damages, in Per Cent of Operating Expenses and Gross Revenue

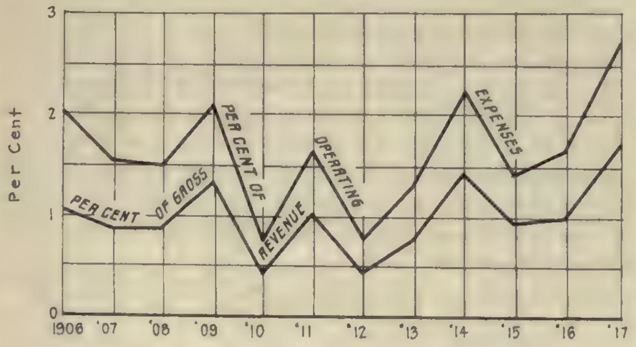


Fig. 3—Cost of Maintaining Overhead Lines, in Per Cent of Operating Expenses and Gross Revenue

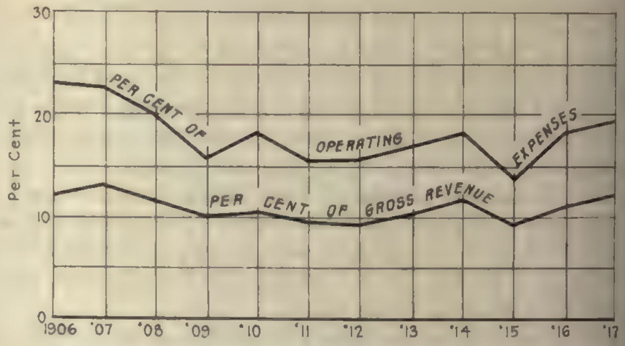


Fig. 4—Cost of Generating and Distributing Power, and of Maintenance of Power Equipment, in Per Cent of Operating Expenses and Gross Revenue

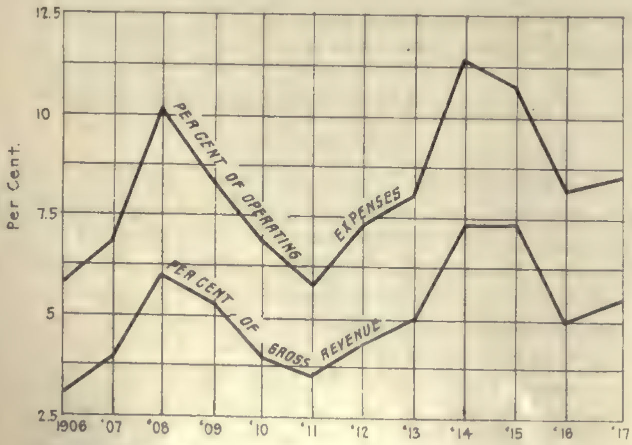


Fig. 5—Cost of Maintaining Way and Structures, in Per Cent of Operating Expenses and Gross Revenue

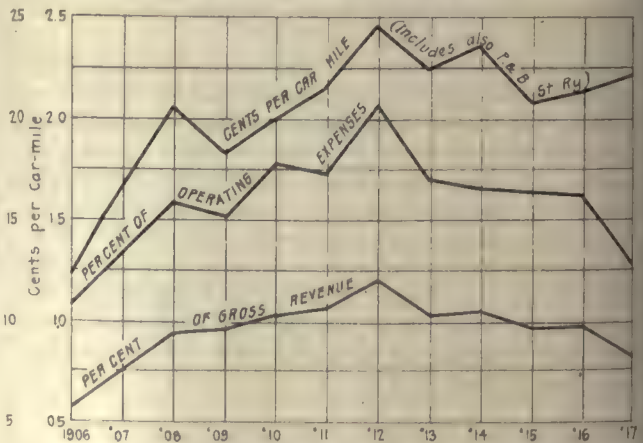


Fig. 6—Cost of Maintaining Rolling Stock, in Per Cent of Operating Expenses and Gross Revenue

OPERATING DATA IN GRAPHICAL FORM FROM BEAVER VALLEY TRACTION COMPANY SHOWING UPWARD TREND OF COSTS OF ELECTRIC RAILWAY OPERATION costs represented in the vertical scales are computed from the following accounts in the standard classification: Injuries and damages—No. 82 (*A* to *F* inclusive); overhead lines—Nos. 17 to 24 inclusive; maintenance, generation and distribution of power—Nos. 30 (*A*) to 31 inclusive, and 48 (*A*) to 56 inclusive; way and structures—Nos. 1 to 16 inclusive and 25; equipment (rolling stock)—Nos. 29 (*D*), 32 (*A*) to 36 inclusive, 38 to 41 inclusive, 66, 67 and 88. In Fig. 6 there has been included a graph of maintenance cost of rolling stock in cents per car-mile, as most equipment men are in the habit of comparing costs on this basis.

# COMMUNICATIONS

## Car Nosing

PHILADELPHIA HOLDING COMPANY
PHILADELPHIA, PA., July 30, 1917.

To the Editors:

I have read with much interest the article by S. A. Bullock, entitled "Car Nosing," that appears in the July 28 issue of the JOURNAL. My observation, based on several years of experience in the truck business, is that nosing is a negligible factor with well-designed and carefully-built double trucks, whether of the swing-bolster or rigid-center type. But some designs of trucks might be built by a watchmaker and still exhibit an excess of nosing because the design itself invites such trouble. A zeal for "flexibility" and "accommodation to the track" is at the bottom of the difficulty with these trucks. Such trucks do not avoid or minimize the effect of low joints and other track irregularities. On the contrary, they seek out these defects and register them in the car body—and the passenger body—with exaggerated emphasis.

The foregoing remarks apply to double trucks and to the so-called maximum traction trucks. There is another type from which no amount of gray matter devoted to design nor of care applied to construction will eliminate the objectionable features of nosing and galloping. I refer to the rigid single truck.

This truck was carried over from the four wheels and pedestals that formerly supported the horse car, and in the earlier days of electric traction its inherent unsuitability was not so noticeable—especially since the time when the modern "Public be pleased" policy was only a minor aim with railway managements. But the steady increase of schedule speeds and of car-body lengths soon brought to light the inherent limitations of the rigid single truck, and until the double truck came to be applied to city cars there was nothing to do but let "nature caper"—and "nose."

The one-man car is now the outstanding object in the electric railway industry. It promises to substitute black ink for red on the monthly statements of many a property. Are its full benefits to be realized when mounted on rigid single trucks? I believe they are not. A longer wheelbase than can be provided with such trucks is imperative.

One-man cars with 28-ft. bodies mean an overhang of 10 ft. 6 in. at each end when mounted on rigid single trucks. This involves a total overhang three times greater than the distance between true centers of support. Unless, meantime, the laws of nature have kindly revised themselves to meet the situation the earlier experience will be repeated and the unavoidable bad riding qualities of such equipment will be exemplified anew—if, indeed, they are not enhanced by modern speed demands and larger car bodies.

J. R. DICKEY.

## Publicity Men and the Association

THE DENVER TRAMWAY COMPANY
DENVER, COL., July 27, 1917.

To the Editors:

Referring to the recent meeting of electric railway publicity men at St. Louis, I would like to ask that a small misunderstanding be cleared up.

In justice to the American Electric Railway Association it should be stated that none of the publicity men who first boosted the meeting, including the writer, had any intention in breaking away from the association and forming a separate organization or of affiliating with the Associated Advertising Clubs. There was no opposition whatever, so far as I know, to becoming a section of the A. E. R. A. This is particularly true in view of the very kind invitation from President Storrs and Secretary Burritt, received before the convention, to affiliate with the association.

When I suggested that the publicity "Round Table" be held at the Associated Advertising Club's convention in St. Louis, it was solely because the time and location of that convention seemed most desirable.

The fact that I, personally, have rather firm opinions about the location of the A. E. R. A. convention meetings and the desirability of publicity men not being so steeped in the worries and trials of the more technical operating departments of the business that they get a badly biased slant to their communication between the railway and the public has nothing whatever to do with affiliation and co-operation with the A. E. R. A.

I was in the midst of a two months' siege of illness when the St. Louis convention took place and consequently did not attend. Otherwise, the misunderstanding on this subject would have been settled then.

J. C. DAVIDSON, Publicity Manager.

## Woman Labor on French Tramways

PONTOISE, FRANCE, July 4, 1917.

To the Editors:

Most of the French tramways have had to employ women to fill the vacancies in subordinate positions caused by successive calls for men since the beginning of the war. Women were first employed as conductors, and the results have generally been excellent, although the Compagnie Générale Française de Tramways (operating the lines in Havre), does not consider their work as satisfactory as that of men. Some other important companies are of the same opinion, although they have no special criticisms to make. In many commercial lines it is considered that the women do better work than men, notably as cashiers. The employment of women as "motormen" has come about only recently because the authorities were long opposed to it.

Certain large companies, for example, the Compagnie Générale Parisienne de Tramways, as early as the spring of 1915 requested authorization to employ women for electric tramway platform work, but it was not until eighteen months later, under pressure of circumstances and notably on account of the complete shortage of masculine labor, that the authorities finally recognized the necessity for permitting it. In a number of large cities in the province the hesitation had been of shorter duration because congestion of traffic was much less than in Paris and on this account the danger of accidents was smaller.

All of the Parisian railways, except the Paris-Arpajon Line, have employed women on the cars for more than six months, and they have given general satisfaction. The results obtained have very often exceeded expectations, because on certain lines (Compagnie Générale Parisienne de Tramways, for example) the women employees have by their alertness averaged fewer accidents than their masculine colleagues. These results can be attributed to the very rigorous examination required of candidates. In fact, they are subjected to two medical examinations, the first directed particularly to determine their physical capacity and soundness; the second covering their psychological capacity, notably the strength of their faculties of attention and courage. The candidates' apprenticeship is also conducted with particular care. LUCIEN PAHIN.

## A Publicity Bureau for the Association

DETROIT UNITED RAILWAY
DETROIT, MICH., Aug. 1, 1917.

To the Editors:

Unless I have misread Mr. Burroughs of Baltimore, Mr. Carraway of the Southern Public Utilities Company, as well as my own views, we have been discussing the advisability of an organized department of publicity within the American Electric Railway Association because of our relationship with the public—not because of our relationship with our fellow employees in the transportation business.

It appears to me, therefore, that Mr. Brashears, director of the Public Utility Publicity Bureau of Chicago, in going to the valiant defence of the privately-operated publicity bureaus, in your issue of July 28, was fighting a man of straw with a war tank.

There come to my desk many interesting public utility magazines of varied formation intended wholly for distribution among the working force of the company circulating the respective publication. It is probable that the genius of the Chicago bureau is to be found in several.

But these are not for the public; they are not circulated among the patrons for the reason they do not discuss relationship with the car riders.

Mr. Brashears is correct in stating that courtesy and loyalty are the same in all places. The Sermon on the Mount reads just the same in Detroit as in wicked Chicago and probably instills its wonderful lessons as well in one place as another, although we are a busy city. Job-lot lessons and patent inside sermons may very nicely fill the bill in inculcating proper behavior, honesty and those other qualifications that are company employee problems. The thing to bear in mind is that these are not the public's problems; they are wholly company affairs. The public is not concerned as to just what lessons are given to motormen, conductors, switchboys, cashiers, trackmen, engineers and the host of other employees.

The passenger wants results as affecting him. Or he wants to know why.

The public deals with the company. The public holds the company, not the individuals, responsible and the only way the company can place its case before the public is, in lieu of individual talks, to have some method of publicity that will reach the public, whether by dodgers, by newspaper space, by posters in the cars or by publications distributed through the cars is a matter of the company managements to decide.

It is quite possible that through your privately distributed employees' publication you have converted Motorman Jones to the belief that your company is entitled to 6-cent fares, but how are you going to put up the arguments and convince John Doe the patron that he ought to pay more for the ride?

As you know, Mr. Editor, I have long and vigorously argued for the formation of a publicity section of the national association along the same general lines as are the existing sections. Whether there should be a distinctive bureau or whether the bureau work should be done in connection with the present organization is a mere detail. I do not for one minute imagine that any member company of the national body has any idea that the bureau work, if a plan is carried out, will do the writing for individual companies. Its work will surely be limited to the gathering and giving of information just as is done now. I fail to see where it is more "unfair and unwarranted" to exchange publicity ideas and information than it is to exchange ideas and information concerning pay-enter collections, methods of track construction and the thousand and one other things discussed between company members either directly or through the association headquarters. It is for such purposes the association is organized.

A. D. B. VAN ZANDT,
Publicity Agent.

## Color Scheme of Signal Indications Changed on Pennsylvania

The new color scheme of signal indications, by which white lights will be eliminated altogether, was recently placed in effect on all lines of the Pennsylvania Railroad east of Pittsburgh. Owing to difficulty experienced in obtaining deliveries, nearly a year of preparatory work has been required to make this change possible.

The decision to eliminate white from the signal color scheme was reached on account of the increasing use of white lights of various kinds in buildings, driveways, roads and streets close or adjacent to the railroad's right-of-way. Under the new plan, green will replace white for "clear" or "proceed." "Caution" will be indicated by yellow. Red will mean "stop," as heretofore.

In addition to changing the glasses in all the semaphore signals, the following devices have been altered to conform to the new plan of color indication:

Marker lights on the rear of passenger and freight trains; switch lamps and targets; markers for track tanks; "slow" signs; "resume speed" signs, and hand lamps at interlocking and block signal stations.

No changes have been made in those short portions of the line which are protected by "position light" signals, the longest of which is the electrified section from Philadelphia to Paoli, Pa.

## A Talk on Capitalization

### Denver Tramway Company Issues Pamphlet for General Circulation, Outlining Some of the Elements of Railway Capitalization

SOME very interesting facts on the subject of electric railway capitalization, presented in rather a popular way, are given in a pamphlet just issued for general circulation by the Denver Tramway Company and entitled "Tramway Capitalization." The pamphlet, which contains twenty-four pages, begins by a reference to the time when "public utilities used to figure that their customers ought to get the Grand Prix Award for cantankerous dispositions and unreasonableness in general, and their customers had it all doped out that the 'soulless corporations' were corrupt and contemptible tyrants, ever hunting for chances to step on the necks of their customers, the people." In those days, politics played a large part in the affairs of public service companies, to the detriment of both the companies and the people, but those days have passed and the relations of the corporations and the public are coming more and more to be on a business basis, to be decided by facts and figures and not by "political flimflam and ossified oratory."

The pamphlet then gives a short sketch of a discussion at an informal meeting of some business men in Denver on the subject of "Overcapitalization." The statement was made by one that the Denver Tramway Company was overcapitalized, but when an official of the company, who happened to be present, began to point out the extent of the property which was not prominently in public view, the cost in dollars of some of the recent improvements and other facts which the original speaker had not considered when he made his charge, the criticism was withdrawn.

Figures are then quoted of recent appraisals of different electric railway companies. Detroit, Toronto and Minneapolis are mentioned as cases where recent appraisals showed the value of the company's property far in excess of the capitalization, and the San Francisco Municipal System is mentioned as an example of a brand new city transportation system which owns no power plant, no central loop, no central carhouse, no office building or represents no investment in older form of transportation but, nevertheless, cost to build $125,300 a mile.

The pamphlet is illustrated with a number of bright "thumbnail" sketches, and copies were sent to the State and city officials, members of the Legislature, the entire staff of each Denver newspaper, editors of all the Colorado newspapers, and members of different civic bodies.

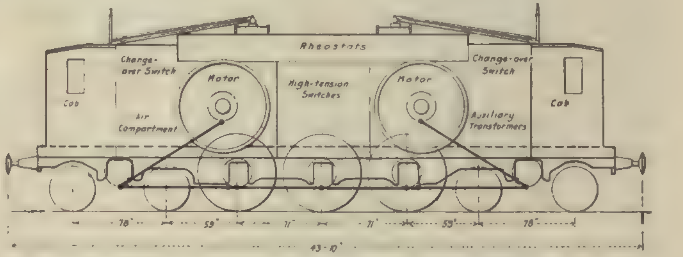
## Subway Construction in Spain Begun

On April 23 work on the subway system in Madrid, Spain, was begun in the Puerto del Sol, which is the center of the Madrid business district. The engineers in charge propose to begin similar construction work soon in eight or ten additional places along the line of the proposed subway and it is calculated that the total number of workmen engaged in this connection will approximate 3000. The period within which it is expected the construction of the subway proper will be completed is fixed at eighteen months from the date work was first commenced and it is expected that another six months will be occupied in laying the rails and completing the stations. American manufacturers who are interested in this opportunity for the sale of their products should communicate in Spanish with the engineer in charge, sending such communications through the United States consulate at Madrid to insure their prompt delivery.

## The New Three-Phase Locomotive for Italy

### Provision Is Made for Four Running Speeds by Using Cascade Connections and Changing from Six to Eight Poles

MANY interesting features have been introduced in the new type of high-speed, three-phase locomotives recently furnished to the Italian State Railways by the firm of Brown, Boveri & Company of Milan. The traffic for which the engines are designed includes only fast service over heavy gradients and sharp curves, the maximum speed of 62 m.p.h. materially exceeding the average normally found on three-phase railways in Europe. In accordance with Italian practice the three-phase system under which the new locomotives are operated has a voltage averaging from 3000 to 3700 and a frequency ranging between 15 and 17 cycles. Two overhead wires serve as conductors for two of the phases, while the rails supply current in the third phase.



ITALIAN STATE RAILWAYS LOCOMOTIVE—ARRANGEMENT OF RUNNING GEAR AND ELECTRICAL EQUIPMENT

The locomotive has a gross weight of 102 tons and a weight on drivers of 55 tons. Two motors are provided and these operate three coupled pairs of driving wheels 64 in. in diameter. At each end of the frame there is a swiveling four-wheeled truck. Four synchronous speeds are provided. These are obtained by connecting the two traction motors in tandem or in parallel as well as by changing the number of poles. With a mean frequency of 16.7 cycles the following schedule shows the arrangements for each speed:

23 m.p.h.—Motors in tandem with eight poles.
31 m.p.h.—Motors in tandem with six poles.
47 m.p.h.—Motors in parallel with eight poles.
62 m.p.h.—Motors in parallel with six poles.

In all connections for changing poles the stator of the primary motor is invariably connected to the line direct. The secondary stator may either be fed direct from the line, or else, by putting the secondary rotor in series with the rotor of the primary motor, the stator of the second machine carries induced current. Both motors have their stator windings star-connected when they work with six poles in tandem and with either six poles or eight poles when they are in parallel. On the other hand, when the motors are running in tandem with eight poles the windings of the secondary stators are changed over to delta connection, so as to prevent the tension on the adjustable resistance exceeding 2000 volts during the starting period. The alteration in the number of poles is produced by suitably inter-connecting the windings, while the system remains permanently three-phase. This is in contrast with the method employed in the earlier types of Italian locomotives, in which, by suitable transformations, current was made either three-phase or two-phase for speed regulation.

A tractive effort of 20,000 lb. is exerted by the new locomotive at the two lower speeds, increasing up to about 21,000 lb. at the third speed and diminishing to 13,500 lb. at the maximum speed. At starting the maximum value of the tractive effort may reach 27,000 lb. The efficiency of the motors at the high speed is 93.5 per cent with a power factor of 85 per cent.

Provision of four running speeds in spite of the complication was considered to be desirable in order to deal with both express and local trains in heavy and light traffic. Apart from the time-table requirements, however, there were important technical reasons for the adoption of four normal speeds. Had there been only two speeds the losses in the rheostat would have been twice as great as those existing with the present arrangement. This would have entailed not only a considerably lower efficiency when the stops were frequent, but also the inconveniences of larger resistance units.

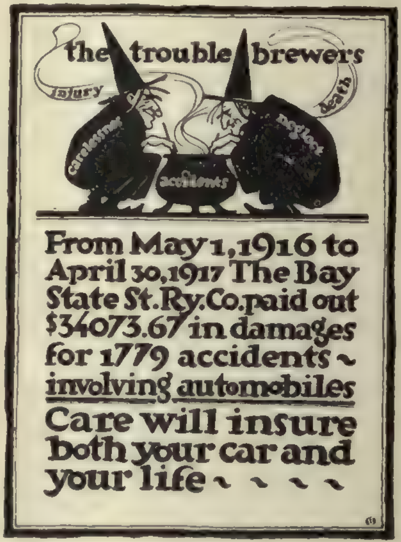
One of the main objects kept in view in the general design of the engine, which includes the use of a separate jackshaft for each motor mounted at the end of the locomotive frame and connected by horizontal coupling rods to the three pairs of drivers, has been to locate the traction motors above the frame and thus to raise the center of gravity of the engine. This position of the motor necessitated the transmission of power through inclined connecting rods to the jackshaft. In the direct-current locomotives used on some of the other lines of the Italian State Railways, the position of the jackshaft rendered it impossible to have a less inclination than 60 deg. for the connecting rod, but in the present three-phase design this inclination has been reduced to 33 deg. A material advantage arises from this reduced inclination since the stresses on the jacket-shaft and bearings are proportional to the sine of the angle involved.

The rods that connect the cranks on the motors with those on the jackshafts are provided with knuckle pins near the lower ends and single bearings are installed on the jackshaft cranks, these coupling together the diagonal motor rods and the horizontal main rods extending between the jackshaft and the first pair of drivers. Thus all of the connecting rods on one side of the locomotive are in the same plane. Spherical bearings are provided on all rods.

The essential difference in the electrical equipment of the present type of locomotives in comparison with former types used in high-speed service on the Italian Railways consists in retaining three-phase operation at all speeds, as before mentioned, instead of transforming from two-phase to three-phase at various speed values. Phase changing transformers are therefore not required, but on the other hand there is much additional apparatus for altering the number of poles. A further point of difference is the arrangement, when running with the motors in tandem, of coupling up two rotors in series, in preference to feeding the stator of the secondary from the rotor of the primary motor. Lastly there is the use of a metallic resistance instead of a liquid resistance for starting and for speed regulation.

## Campaign to Reduce Collisions with Automobiles in Boston

The Bay State Street Railway is using some new posters this month in an endeavor to impress upon automobile owners the importance of co-operation in reducing collision accidents. The first poster, reproduced herewith, was placed a few days ago on the bulkhead windows of all Bay State cars, two posters to a car. These were to be kept up two weeks after which the hand lettering was to be routed out from the plate and new facts and figures substituted. The company expects to keep after the automobile drivers until school opens in the fall, when a campaign with school children will be inaugurated. The details of the children's safety campaign have not yet been worked out, but the company's larger posters will probably be reproduced on cards and distributed to the children in the schools. The automobile posters have been used in waiting rooms, etc., as well as in the cars, and copies are being sent to all the newspapers published in the Bay State territory, together with a letter from President P. F. Sullivan.



From May 1, 1916 to April 30, 1917 The Bay State St. Ry. Co. paid out $34073.67 in damages for 1779 accidents involving automobiles

Care will insure both your car and your life

POSTER FOR USE IN BOSTON SAFETY CAMPAIGN
(Size 14 in. x 18 in.)

## AMERICAN ASSOCIATION NEWS

### "System" Discussed at Manila

At a meeting of Joint Company Section No. 5, held in Manila, P. I., on June 5, J. W. Earle, assistant to the auditor, read a paper on "System." In it he illustrated the importance of organization and an orderly and systematic personal and business life conduces to efficiency and success. Thirty-nine members attended the meeting, and three railway men and two lighting men were elected to membership.

### Transportation Terms

During the past season the company sections have been considering a list of definitions of electric railway terms compiled for the purpose in the association office. These had been received from several committees of the Transportation & Traffic Association. Seven of the sections have now sent in comprehensive reports on these proposed definitions, assisting materially in the attempt to clarify the phraseology in an important division of the electric railway field.

# EQUIPMENT and MAINTENANCE

HAVE YOU A GOOD WAY OF DOING A JOB?
*—Pass It Along*

*In This Issue:*

S. L. Foster Advocates Prevention Rather Than Cure in Overhead Work

## Taking Down Feeder Cable by Rapid Means

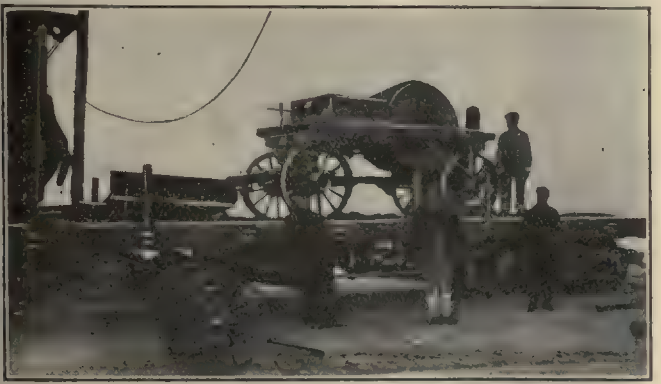
BY E. H. HAGENSICK
Superintendent of Electric Lines, Omaha & Council Bluffs Street Railway, Omaha, Neb.

Taking down of old cable on the Omaha & Council Bluffs Street Railway has been greatly facilitated by the use of a home-made motor-driven cable reel, which is mounted on an ordinary wagon running gear for easy transportation from one location to another. An old street railway motor is supported at the front of the built-up frame and connected by a train of gears to the reel mounted just behind the motor. The reel is large enough to take 1500 ft. to 2000 ft. of 500,000-circ. mil. cable at a time.

When any length of cable is to be removed it is taken off the insulators and laid on the crossarms. The end of the cable is fastened to the reel, and the motor, supplied with energy from the trolley, is used to pull the cable in and wind it up. The cable is allowed to slide over the crossarms in some cases, but usually it is pulled over idlers fastened to the insulator pins, snatch blocks being used on curves.

For cases in which it is not intended to put up the cable in another location at once, a scheme has been arranged for utilizing this same motive power to wind the cable onto a storage reel. For this purpose two channel arms, extending out behind the wagon, are fastened on the rear of the wagon frame. These support between them a shaft on which this storage wheel is mounted. This shaft is connected by a long chain and sprockets to the motor, and the cable may thus be wound directly on the storage reel.

This outfit also finds many other uses in the line work. A "niggerhead" is mounted on the end of the reel shaft, and is used for raising and setting steel poles, and any gin-pole work, etc. With these various uses the outfit comes into play frequently. By virtue of this, and its great time-saving features, the investment tied up in it is readily justified.



POWER-DRIVEN CABLE REEL MOUNTED ON WORK CAR

REELING UP FEEDER CABLE

## Keep-Up versus Pick-Up in Overhead Maintenance

### Better to Keep Up Rather than to Rush Out and Pick Up the Overhead Construction

BY S. L. FOSTER
Chief Electrician United Railroads of San Francisco

Maintenance of the trolley wire in approximately continuous service consists either in extremely rigid and repeated inspections and renewals, or in the use of many emergency crews with their numerous expensive essentials, or in some combination of these two.

In cities where great extremes of temperature exist and destructive sleet storms occur possibly many emergency line crews are justified; but in San Francisco, where there are 250 miles of single track with about 600 heavy four-motor cars and the most numerous and steepest grades of any city in the world, not even one day-emergency line crew is maintained. The numerous Eastern crews, idle much of the time, therefore seem inefficient to us. In San Francisco the policy has been to keep up rather than to rush out and pick up the overhead construction. We also expect linemen to do only line work.

The existence of idle men at the scattered houses of a city's fire department is justified since about 75 per cent of the fires are of incendiary origin and no amount of house-to-house inspection could produce results likely to justify the cost of the work. The failures of overhead wires, however, are seldom or never of malicious origin, and to a great extent they can be anticipated by continual, conscientious inspection and renewal of the worn parts.

Three crews of linemen, two with horse-drawn Trenton tower wagons and one with a tower car, cover the 250 miles here and attend to all the construction and maintenance, except the pole setting and painting, on which a small crew of Italians is employed. These linemen are never idle winter or summer, being continually occupied in going over and over the lines according, roughly, to a car-mileage basis. Their work is almost exclusively done in the daytime. The foremen call up the office by telephone at regular short intervals, and one of these crews is usually nearer a reported emergency call and more alert than if the men had remained in the quarters waiting for the call. On exceptionally rainy days they overhaul the construction in and about the various carhouses of the company. A three-man night emergency crew is kept at headquarters from 5 p. m. to 7.30 a. m., but the men sleep calmly through much of their watch more often than otherwise. All their repair work is done with a high-speed tower car.

On five days of the week the three day crews inspect, overhaul and repair span by span the lines assigned them. On Saturdays two of the crews in line cars cover all the outside lines in a general patrol and inspection. On Sundays and holidays two small day emergency crews cover ten hours in two eight-hour overlapping watches and usually sit about idly through the day or polish up their equipment.

Possibly this everlasting combing and recombing may cost a bit more sometimes than the laissez-faire and pick-up method would, but the interruptions to the revenue car service are certainly kept down to a reasonable figure.

In the last month of available records, that of May, 1917, the number of trolley-wire breaks causing interruptions to the service was 1.5 per million car-miles. There were a few more breaks at the ends of section insulators, but, being held up by the single-end strain ears, the trolley wire did not fall to the ground and no interruption to the car traffic resulted. Two of these three trolley-break interruptions were from burn-offs of full-sized wire by foreign wires crossing them.

Certain features of San Francisco practice may explain the above policy and results. There is neither snow, sleet, ice nor lightning to contend with. The strain insulators used are made of porcelain under compression, are incombustible and almost infallible and have a long life. The most casual visual inspection will reveal their physical and electrical condition, whereas the more expensive composition strain insulators used in the East have only a limited life and their electrical condition cannot be learned except by an electrical test.

There are no such things as "hot" iron poles in San Francisco, no matter what the weather, as there are always two, usually three, and very often four, insulators in series between the trolley wire and the pole. No solder is used on the trolley wire except for a few short single-end strain ears installed just beyond the ends of section insulators.

Home-made 15-in. clinch ears and solderless splice ears, holding each trolley wire end by one set-screw, simplify the repairs. Cheap steel replaceable wearing plates, often made from the master mechanic's waste from car construction or repairs, are standard for the under side of frogs, and cam-tip ears for the ends of frogs. Section insulators and crossings are also looked upon with favor as reducing the number of unexpected breaks in worn as well as nearly full-sized hard-drawn trolley wire at the ends of these overhead devices. Phono-electric wire is found economical at points of greatest wear and is being utilized in increasing amounts.

Electric track-switching devices are all connected so as to have ample drainage directly to the sewer, and these devices, together with electromagnetic signaling apparatus and automatic sectionalizing switches, are given a thorough overhauling each month by the shop crew.

When worn trolley wire is taken down it is annealed and used in the fabrication of special underneath rail bonds so that painstaking and possibly dangerous economy in the renewal of worn trolley wire is not so important as it would be if the wire taken down had to be sold as scrap. The anchor guys from wood poles to ground are made of ½-in. extra-galvanized steel strand, twice paint-dipped. The diameter of span wires is ⅜ in., and that of pull-offs 5/16 in. and ¼ in. No trolley strain guys are used. Nothing smaller than ¼-in. strand is employed anywhere, nor is any solid iron wire used.

During the linemen's strike, when great success was being achieved by us with green men, one of the strikers ruefully admitted the explanation and incidentally complimented the department when he said: "You put up your work too damn strong." The excess in size of the strand used here over usual practice is on account of our damp climate and proximity to the ocean. This difference, however, forms only a trifing increase to the total cost of constructing an electric road and is well justified as a premium in insuring freedom from interruption to revenue traffic.

A modern double-track trolley road may easily cost $100,000 per mile, with the overhead construction costing $5,000 of the total, or 5 per cent. Of this $5,000, the span wire, if ¼-in., which is used in many places, will cost, at 5 cents per pound, $12.65. This is one-quarter of 1 per cent of the 5 per cent or one-eighth of 1 per cent of the whole. To substitute ⅜-in. for the ¼-in. will increase the cost of this $100,000-per-mile road just $20.38 or one-fiftieth of 1 per cent. In saving this one-fiftieth of 1 per cent by retaining the ¼-in. strand for span wires and maintaining emergency crews to rush out to repair it when broken by wild trolley poles, instead of adopting ⅜-in. wire for this exposed part of the overhead and practically eliminating broken spans, seems a very short-sighted policy, even if the lost income from interruptions to the revenue cars and disorganization of schedules be not considered. With the latest practice of using heavy 6-in. trolley wheels and 30-lb. upward pressures the blow from a wild pole resembles that from a sledge hammer and really justifies ⅜-in. spans if nothing else does.

The same line of argument applies pretty generally to all the overhead construction, since it is subject to abnormal stresses and justifies abnormal factors of safety both in construction and maintenance. Considering the fact that the overhead costs only 5 per cent of the initial cost of the construction of the whole road, and absorbs less than 1 per cent of the company's maintenance expense to keep up, and more especially considering the deadly effect its failures have in reducing the company's cash income and in rendering futile the far heavier expenditure for platform men, power generation and maintenance of tracks and cars, it is plainly an extremely important element in the operation of the road and fully earns these factors of safety.

When a generator burns out it can be disconnected from the busbars and another thrown on the line. When a car breaks down it can be withdrawn from the street and another one brought out. If a rail or a crossing breaks, the operation of the service can be continued, but when a trolley wire breaks the whole system of interdependent elements of operation is paralyzed.

The wisdom of an engineer of many years' experience is apropos here. "If you do a cheap job," he said, "you receive very little credit and get condemned forever afterward as the weaknesses in the construction develop. If you do a good job, you may get a going-over on account of the cost at the time, but you never hear of that piece of work again."

It should be added that some of the few men around the linemen's quarters normally engaged on design, construction or upkeep of appliances, concrete poles, electromagnetic block signal devices, electric track switch parts, etc., are competent to tie up a fallen wire temporarily, and occasionally do this while awaiting the arrival of the line crew. The efficient inspectors of the operating department and busy mechanics from the various carhouses also are of great assistance in emergencies in maintaining the car schedules until the linemen come. In other words, everybody works all the time here except the Sunday and night emergency crews. These emergency men are intelligent and energetic, but these units are inefficient simply because there are not enough breakdown jobs to keep them occupied all the time.

This system of perhaps overdoing the keeping up of the overhead also makes it possible to take all the members of this department off the maintenance work for weeks at a time and concentrate them on a construction job without the car operation suffering appreciably. The necessity for intermittently putting on and laying off men is thus eliminated.

## Track Maintenance in War Time*

### High Cost of Material and Labor Requires Conservation and the Introduction of Many Labor-Saving Devices

BY P. NEY WILSON

Roadmaster New Haven Division the Connecticut Company, New Haven, Conn.

When one stops to consider that the maintenance of way costs are often 20 per cent of the total operating expenses of a railway, he is convinced that the importance of this department is generally underestimated. Way engineers and men of the field delight in construction work, but the steady grind of track maintenance is not so pleasant, although many times it is of greater importance; and it should be emphasized that careful thought and planning in the maintenance service saves much trouble and money in the end. Also the abnormally high cost of labor and material at present makes it necessary to resort to labor-saving machinery and new methods in order to meet the pressure along lines of reducing operating expenses. With these facts in mind the writer desires to mention briefly some new developments in maintenance and construction of electric railway tracks.

The conservation of old rails in newly-paved streets, intelligently accomplished, has meant the saving of many dollars to some companies. In the past it has seemed unwise to allow old rails to remain in a newly-paved street, particularly on account of the conditions of the joints. Even if they had been formerly welded, the grinding necessary to remove depressions in the rail ends would leave a sharp vertical curve in the surface at each joint, and these cups would quickly cause loose joints, due to the wheel loads dropping into them. However, with the aid of the arc-welding machine, the cupped rail ends may be built up, ground to a true surface by rotary and reciprocating track grinders; and so long as the rails remain tight, a good joint may be maintained. Innumerable repairs may be made on frogs, switches, curved rails, broken rail joints, etc., where in the past replacement was necessary. Instead of discarding a broken switch or frog, it is frequently possible to repair it by welding, consequently avoiding the expense incident to the purchase of a new piece. It has been definitely shown that in four weeks' constant use the saving effected by this machine has paid for itself outright. The electric arc-welding machine is not a cure-all but it is certainly a valuable machine to any electric railway company.

The kind of rail joint used and the character of the foundation on tangents in paved streets almost entirely governs the life of the structure except, of course, those removals due to relocation, new pavement, etc. The life of a T-rail in paved streets is practically indefinite if the foundation is permanent and the tracks made jointless by welding. These features are worthy of any engineer's best efforts, for a real solution of the problems connected with them insures practically an ideal track.

Since there is no mechanical joint connection that will absolutely hold the rail ends rigidly to the surface and alignment for an indefinite period, one is led again to the consideration and use of welded joints when laying new track. It is also good practice to grind all joints immediately after a track is laid, assuring a smooth even joint at the beginning, since loose joints and attendant pumping action of rails on pavements are avoided when the ends of the adjoining rails are at the same elevation. The International twin steel tie supported by either ballast or concrete foundation presents many good features. It should be emphasized that more care be given to the bearing power of the subsoil because, as previously stated, the foundation is very important. Foundations should be drained wherever possible.

A saving of fully 50 per cent in cost may be attained by substituting pneumatic tie tampers for hand labor. This type of tamper is fast gaining prominence. The introduction of machine drills many times allows a saving in cost of 75 per cent over that of hand labor and the use of a power shovel in excavating for track work as compared to hand labor shows a saving in favor of the power shovel of at least 60 per cent.

While the removal of snow from city streets has little to do actually with the construction and maintenance of track, it has a very great influence on the operating expense, and is one of the responsibilities of the maintenance-of-way department. Through the co-operation between the city of New Haven, Conn., and the Connecticut Company, permission is granted to dump snow into the sewers in specified locations. This method of disposal is fully 30 to 40 per cent more efficient than the ordinary method used.

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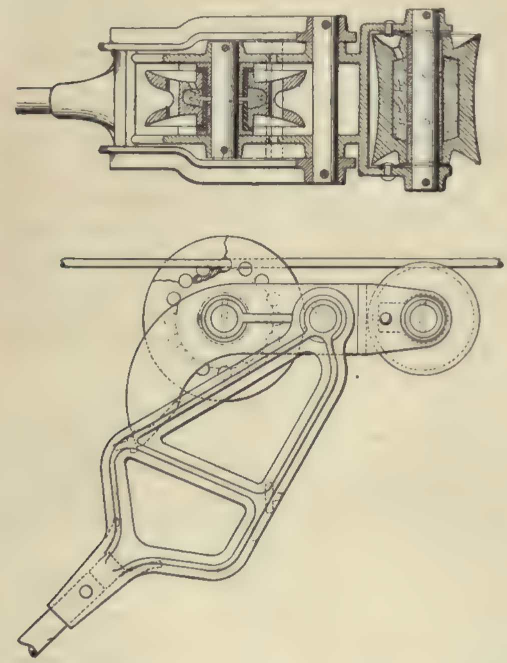
*Abstract of a paper read before the Connecticut Society of Engineers.

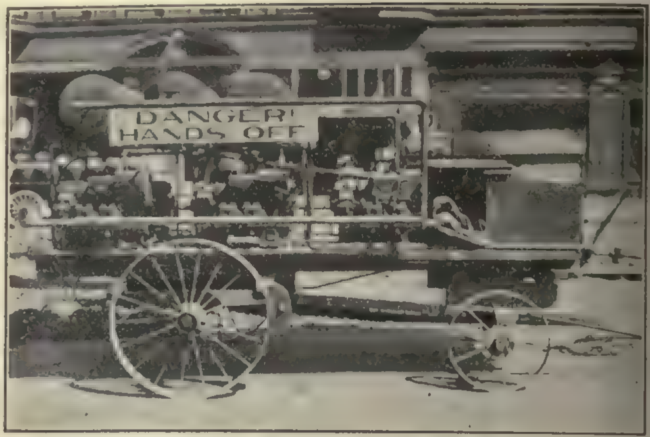
## Double-Wheeled Trolley Harp on Cleveland Railway

A current-collecting device which has two wheels, one of which may be used for ice cutting, is shown in the accompanying drawings. It consists essentially of a pilot wheel and the trolley wheel proper. The pilot wheel has the V-shaped periphery of an ordinary wheel, whereas the main current-collecting wheel or roller has only a slightly concave surface. The two wheels are supported in an equalizer frame which is pivoted on a shaft in the harp. Current is collected by both wheels. The pilot wheel serves primarily to keep the trolley on the wire while the roller insures a good contact when the trolley is traveling over special work. The frame rotates somewhat around the pivot shaft to allow the two wheels to follow sudden changes in the elevation of the wire. The movement is limited by stops on the harp, but the tendency is to force one wheel against the wire when the other wheel bounds away.


TWO-WHEELED CURRENT-COLLECTING DEVICE, CLEVELAND (OHIO) RAILWAY

The pilot wheel is removable and may be replaced by an ice-cutting wheel. This is of the same shape as the pilot wheel, but it has a number of transverse holes at the base of the groove which bring sharp cutting edges in contact with the wire and strip the ice from it. The ice-cutting wheel is insulated from the supporting frame, leaving the back roller as the current-collecting wheel.

This device was invented by James Scott, superintendent of overhead, Cleveland Railway, and has been used to some extent on this property.



HOME-MADE PORTABLE AIR COMPRESSOR FOR USE WITH TIE TAMPERS

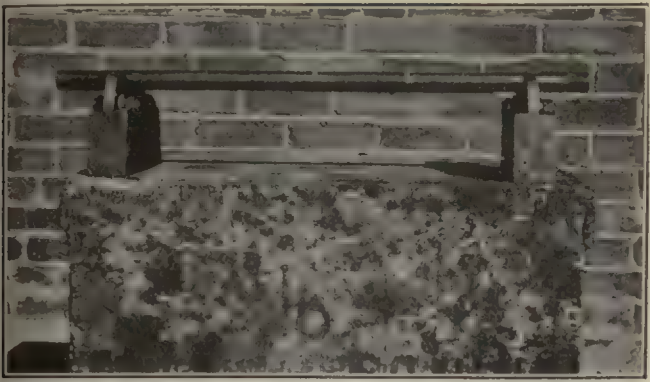
## Home-made Compressor Outfit Increases Tie Tamper Savings

When the matter of using pneumatic tampers was brought to the attention of the San Francisco-Oakland Terminal Railways, the first cost was a prime consideration owing to the widespread need of retrenchment. It was happily suggested, however, that the cost of the compressor, say $500 or more, could be saved by using some old railway compressors.

The suggestion was carried out by mounting a battery of six 11-cu. ft. capacity pumps on a truck as shown in the illustration. The actual capacity required for the two Ingersoll-Rand tampers used is only 32 cu. ft., but double capacity was installed because the old machines were not good for continuous service at more than 50 per cent loading. These tampers have proved particularly successful in tamping heavy special work. On this railway the machines have allowed six men to do the work which formerly required sixteen. Of the six men one is stationed to flag vehicles while another handles the connection to the trolley wire, leaving the remaining four to do the tamping.

With labor at $2.50 a day, the relative costs are: Air tamping, $15; hand tamping, $40—a saving of $25 a day. As a matter of fact the tampers paid for themselves within ten days. These tampers are also used for flat tamping of ballast in advance of concreting. They are fitted with chisels when wanted for clipping concrete and with cutters when used in stripping out asphalt.

TIE TAMPING AT OAKLAND, CAL.



SHAFT MOUNTED FOR ECCENTRICITY TEST

## Device for Testing Bent Axles and Shafts

Instead of using the customary method of putting armature axles and the like in a lathe to determine whether or not they are bent, W. C. Duggan, machinist, Knoxville Railway & Light Company, Knoxville, Tenn., uses the device shown in the accompanying illustration, which he finds accomplishes the same purpose in much less time.

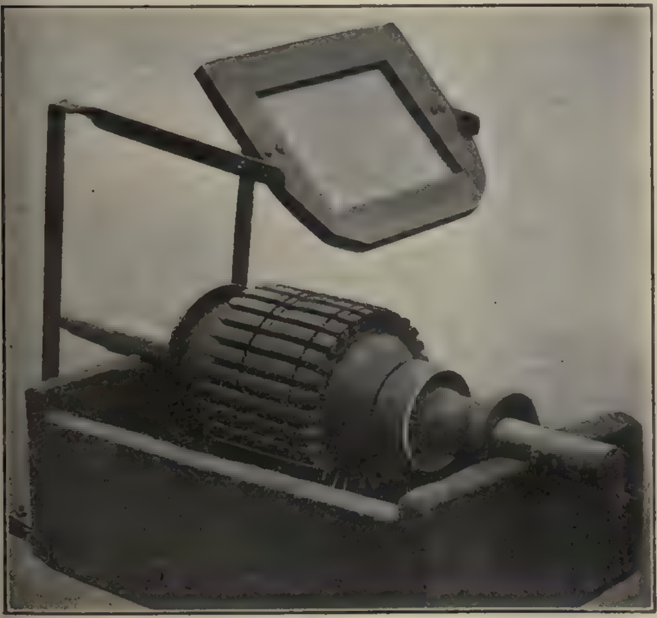
Two pairs of accurately machined 3-in. wheels are mounted on two blocks, and the axle or other shaft to be tested is placed so that it is supported on each end by a pair of wheels. It is then rotated by hand and tested by holding a piece of chalk close to the revolving shaft.

## Wireglass Guard Which Did Its Bit for Safety First

BY HENRY MEYER

Master Mechanic Beaver Valley Traction Company, New Brighton, Pa.

In grinding out the laminated cell slots of armatures the grinding wheels must be of light construction on account of the narrowness of the slot, and this makes them liable to frequent breakage. A guard consisting of a wooden frame which holds a pane of wireglass has been rigged up as shown in the accompanying illustration. As will be seen, the glass is cracked, showing that it has already done its bit in stopping a broken section of grinding wheel.



GUARD FOR USE IN GRINDING ARMATURE SLOTS

## Outdoor Switch Houses for Industrial Loads

An open type of switch-house construction has recently been brought out by the Westinghouse Electric & Manufacturing Company to provide the maximum of accessibility. In the switch house shown in Fig. 1 the oil circuit breaker is mounted on a specially constructed bracket and the meters are mounted on a slate slab. The bracket is so designed that it will take different sizes of breakers. This method of mounting the circuit breaker permits easy inspection of wiring, removal of oil tanks, inspection of contacts and replacement of fuses which are used for the purpose of protecting the voltage transformers.

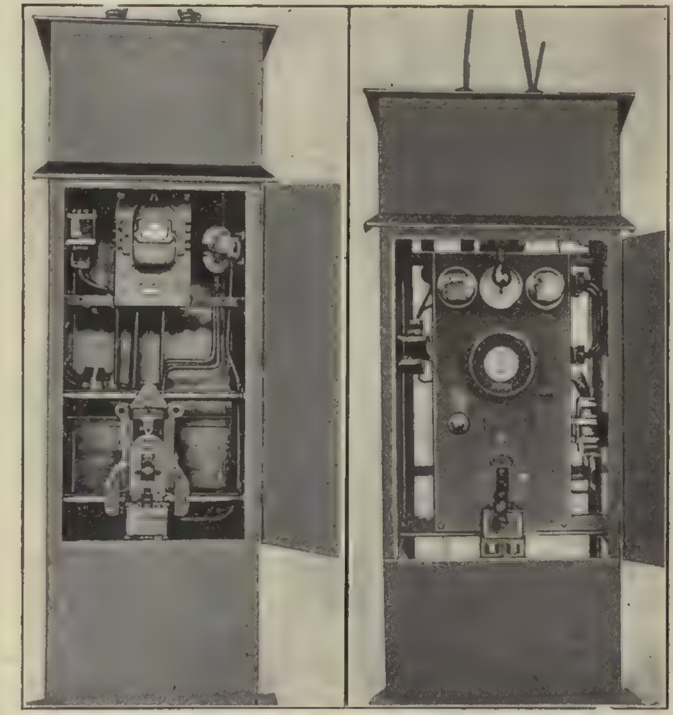


FIG. 1—OUTDOOR SWITCH HOUSE WITH BRACKET-MOUNTED CIRCUIT BREAKER. FIG. 2—OUTDOOR SWITCH HOUSE WITH PANEL-MOUNTED CIRCUIT BREAKER

A ground-mounted switch house with panel-mounted circuit breaker is shown in Fig. 2. The circuit breaker and instruments are all mounted on one slate slab. While the construction is not as open as that previously described the equipment presents a very neat appearance.

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The Detroit United Railway, having found that sprinkling the roadbed of its interurban lines with road oil is a satisfactory means of killing vegetation and laying the dust, has just put in service a 8000-gal. tank car. This car is equipped with a motor-driven pump by means of which oil is pumped from steam railroad tank cars into the railway's car. In operation the car is drawn by one of the motor construction cars, and the oil is distributed over the roadbed by a sprinkler pipe arrangement.

# London Letter

## Objection to Glasgow War Lottery—Glasgow Surplus for Year £160,000—Bulk Production of Electricity Proposed

*(From Our Regular Correspondent)*

The Corporation of Glasgow is threatened with an action in a court of law to test the legality of its prize-drawing scheme in aid of war charities. The question is whether or not the scheme is a lottery within the meaning of the acts of Parliament which render lotteries illegal. It is understood that the Lord Advocate has advised that it is contrary to statute, and the Secretary for Scotland, acting on this opinion, is believed to contemplate raising the point by an action at law. Passengers on the Glasgow tramcars are invited to buy as many tickets as they please at a penny each. The bulk of the money realized is devoted to war charities, a small percentage being retained for prizes which accrue to the holders of certain tickets drawn by lot and declared to be the prize winners. In the first eleven weeks of the scheme an aggregate sum of £16,881 was realized, on which £12,500 was handed over to various charities, £3,278 spent on prizes, which consist of pictures by well-known artists and war savings certificates, and the remainder placed on temporary deposit at the bank. Neither the popularity of the scheme nor the fact that deserving charities have benefited to a large extent has any force in a court of law. The question confronting the corporation is its legal standing in the matter. That seems to be settled by statutory enactment and legal precedent. The only legal form of lottery in this country is that known as the Art Union Drawing, which is specially exempt by the act of 1846 from penalty. The matter has been referred to a committee which has decided to discontinue the sale of the tickets for the present, but is making efforts to interest the necessary authorities in order to have the drawing legalized under the Art Unions act. The scheme as it stands is illegal and must therefore be discontinued, but the benefits derived from it in the interests of war charities are so great that every effort will be made to renew the scheme in some modified form which will bring it within the law.

In the meantime, it is interesting to learn that details of a record revenue for the department are given in the accounts of the Glasgow Tramways for the year ended May 31, which have been submitted at a special meeting of the corporation committee. The surplus for the year amounts to £160,984, and will be handed over to the common good. Last year the surplus was only £43,548, while the largest previous surplus was £68,000, in 1911. On the expenditure side of the accounts there is an item of £92,645, charged to the European war. This represents payments to dependents of employees on active service and war bonuses to workers.

A scheme for the bulk production of electricity for the whole country is now under consideration by the special committee appointed by Sir Albert Stanley, president of the Board of Trade, last March. The form which this scheme will probably take will be the division of the whole country into seven areas, one of which is the metropolitan area. The idea is that a company shall be formed to purchase the existing undertakings in each area and amalgamate them.

Considerable interest is being manifested in the use of coal gas as the propelling power for motor buses. The Bath Electric Tramways, Ltd., is experimenting with vehicles which run from Bath to Frome and from Bath to Midsomer Norton. W. E. Hardy, the general manager and engineer of the company, estimates that 300 cu. ft. of gas are approximately equivalent to 1 gal. of petrol. The cost of the former is 1*s.* 2*d.* and of the latter 2*s.* An important factor in the cost of the adoption of coal gas is the expense of the purchase of the holder. Each gas holder costs between £30 and £40. The use of gas gives more trouble than petrol, and Mr. Hardy regards it as being distinctly a war-time expedient. The innovation has also been introduced on a line between Bishop Auckland and Durham by the United Automobile Services, Ltd., whose headquarters are at Lowestoft. With petrol cut down, and the use of substitutes forbidden, there was no alternative for the company but to fit up its cars to use ordinary town gas, such as is used in many gas engines, direct out of the town mains. Gas-driven tramway cars have been in use at Neath, South Wales, for more than two years. On the whole, the system is fairly satisfactory. With modern engines of a lighter type there are many advantages in favor of gas-driven cars. The cost works out at 9*d.* a mile at Neath, and as the gas is obtained from the Corporation Gas Works, it furnishes the ratepayers with a substantial source of revenue. The storage cylinder on the Neath cars is carried on the chassis under the floor of the car. It is recharged after each journey of 4 miles by means of a flexible coupling connected to steel cylinder receivers in the compressing room.

The directors of the Edinburgh Tramway have arranged to confer with the tramway committee of the Town Council regarding the threatened strike of tramway workers in connection with their demand for a war bonus of 7*s.* 6*d.* a week. The company, as lessees under the corporation, will make a representation of the position in which it finds itself at present owing to depleted staff and increased costs, and as it is affected by the demand of the employees. The company desires a reduction in the rent paid to the corporation and a reduction in other charges, or a revision of fares. Apart from this conference, there have been no other developments in connection with the dispute.

The action of the Council of Birkenhead in raising the tram fares on all the routes in the borough has been received with mixed feelings. The 3-halfpenny fares on various routes had become popular, no objection being taken to the odd halfpenny. The argument for the increase is that the town is thriving and there is no shortage of money. Capital is required to rehabilitate the overhead equipment and relay the track. The outlay of funds for both kinds of work is computed at £35,000, according to the lowest estimate submitted.

The Council of Bootle has decided to enter into a new agreement for a pediod of twenty-five years from July 1 with the Liverpool Corporation for the repair and maintenance of the Bootle tramways. The agreement provides that Liverpool shall pay a rental of £500 a year for the first six years and £1,000 a year for the remaining period for the use of the tramways. The Liverpool Corporation will be responsible for the upkeep of the rails and paving within the tramway limits, the corporation of the Bootle to do the final reinstatement work. With regard to the overhead equipment, the Liverpool Corporation is to allow Bootle a sum of £43 a mile a year for maintenance. The equipment is to be handed over to Bootle at the end of the period in usable condition.

There is strong opposition in the Potteries from a number of business men and from all the leading members of the Labor party to the proposal of the Council of Stoke-on-Trent to renew the lease of the Potteries Electric Tramways until 1932. The new agreement proposes that the company shall carry out certain improvements in the permanent way and rolling stock, that it shall not increase fares, and that it shall pay the corporation £1,000 a year during the term of the lease. The North Staffordshire Trades & Labor Council has decided to call upon the Town Council to purchase the tramway undertaking and convert it into an up-to-date service for the convenience of the public of the Potteries.

The circular issued by the London United Tramways to the holders of the first debentures shows that the position of the company with respect to that security is very serious. The earnings so far this year have barely covered expenses and in consequence of the failure to keep the track and the rolling stock in good physical condition the earning capacity has decreased steadily. It is both difficult and expensive to secure labor and materials to maintain the property, but if renewals had been properly attended to before the war the position would have been infinitely better than it is to-day. The shareholders may have to submit to a scaling down of their capital before the undertaking is placed on a sound financial footing. A. C. S.

# News of Electric Railways

Traffic and Transportation
Financial and Corporate
Personal Mention
Construction News

## Seattle and Tacoma Strikes Settled

### Arbitration Agreement Reached on Aug. 1 and Service Resumed on Aug. 2—Agreement to Run One Year

The strikes of the railway employees of the Puget Sound Traction, Light & Power Company in Seattle and Tacoma, Wash., terminated on Aug. 1. Cars in both cities resumed operation on Aug. 2. The men are to be permitted to organize and affiliate with any union. The company agrees that there shall be no discrimination against union employees, and the men agree to work with non-union employees. The company agrees to reinstate the discharged Seattle employees. The seven discharged Tacoma employees will be reinstated providing the arbitration board of Tacoma railway employees sees fit. The settlement of matters relating to wages and working conditions will be submitted to an arbitration board consisting of Dr. Henry Suzzalo, C. J. Franklin, representing the company, and James A. Duncan representing the employees. The findings of this board or a majority of it are to be effective from Aug. 1 and to be binding on the company and the employees for one year.

### DEVELOPMENTS PREVIOUS TO THE SETTLEMENT

The city of Seattle, on July 26 was still without street railway service, although for the first time since the men walked out on July 16, both sides had agreed to conferences. Concessions made by the strikers' general committee on July 25 opened the way for the first actual conference between the railway officials and the strikers. Through the efforts of the King County Council of Patriotic Service, the strikers' general committee was induced to agree to a conference at which five men from Tacoma, five men from the Seattle force, and the officials of the Puget Sound Traction, Light & Power Company, including A. W. Leonard, president, A. L. Kempster, manager, at Seattle, and Louis H. Bean, manager at Tacoma, were present. This conference, held on July 26, lasted about two and one-half hours, and was held behind closed doors. Officials said that nothing definite had been accomplished, but that progress toward peace negotiations was being made. Company officials felt that they gained a point by the conferences, as one of their most persistent demands was that they be permitted to meet a committee of employees without the presence of outsiders.

Following the signing of an alternative writ of mandate by Judge Boyd J. Tallman, noted in ELECTRIC RAILWAY JOURNAL of July 21, directing the company to resume operation, the company made an attempt on Friday, July 20, to operate two cars on the downtown streets. A crowd of strikers and sympathizers surrounded the cars, and bombarded them with bricks, rocks and other missiles. The windows in the cars were broken, and the motormen and conductor were badly injured. A second attempt was made on Saturday to operate a car.

Following the riots of July 20 and 21, the company applied to Federal Court Judge Jeremiah Neterer for an injunction restraining strikers and others from interfering with the operation of its cars. Judge Neterer in an opinion rendered on July 26 stated that the situation called for executive action, not judicial, and denied the injunction. The company's petition asked that a sufficient number of U. S. marshals be appointed to protect the company and its employees. Judge Neterer, in his opinion, stated that the company was asking the Federal Court to do what should be done by the executive branch of the State and city, or in other words to "police the city." He declared that this was not the proper function of the court. He also pointed out that "the right to employ labor, and the right of labor to be employed is inherently and universally recognized by the courts." The opinion concluded: "The court regrets that in times of stress, in an enlightened community of patriotic citizenship, the parties may not, in spite of the provision of the company's franchise, arbitrate all disputes and grievances."

Before taking up the company's application for an injunction, a hearing was given on the city's motion to remand to the State court the city's case asking for a mandate to compel the company to operate cars or submit to the appointment of a receiver. The case was taken under advisement after arguments in behalf of the city.

Mayor Hiram C. Gill stated that he would afford all the police protection possible when the company put forth a serious effort to resume service. He said that every policeman available would be utilized, although he was inclined to the belief that he should not be expected to place men on screened cars operated on Second Avenue, one of the main business streets. On that point he was quoted as follows:

"That is just a mild invitation for disorder that may result in bloodshed. It isn't a *bona fide* effort to resume service. At the present I am inclined to take such steps as are in my power to prevent a recurrence of the riots of July 20 and 21. If the company intends to attempt to resume service on all of its lines, serving the outlying as well as the business districts, I am inclined to believe that I would afford all of the cars such police protection as can be made available."

From July 17 to 23 the police records show that there were 181 accidents in which fifty-three persons were injured, resulting in the death of three. This was the toll taken by the automobiles, motorcycles and trucks which made an effort to transport the population of the city. Forty-three arrests for speeding were made in less than a week.

Division A of the Seattle Municipal Railway reaped a harvest during the strike. Passenger revenues, which have ranged from $38 to $45 a day for several years, jumped to about $340 daily.

On the tenth day of the strike in Tacoma the Tacoma Railway & Power Company was operating seventeen cars on downtown streets. On July 25 Manager Louis H. Bean stated the cable line would be operated immediately. Each car carried an armed guard, but no violence was reported.

Mr. Bean has reiterated his stand on the matter of meetings and conferences with the strikers. He said:

"I will meet at any time and talk upon any subject with present or former employees of this company, but I have absolutely no business with any representative of the Amalgamated Association of Street & Electric Railway Employees of America."

A suit to compel the Tacoma Railway & Power Company to resume service was brought in the Pierce County Superior Court on July 23 by the State Public Service Commission, represented by Attorney General W. V. Tanner, and city of Tacoma represented by City Attorney U. E. Harmon. The filing of a petition for a writ of mandamus or an injunction compelling the company to provide adequate and safe service was followed by a formal order by Superior Judge Easterday, fixing July 26 as the time of hearing of the summary proceedings. The action was brought in the name of the State of Washington, on the relation of the State Public Service Commission and E. F. Blaine, A. A. Lewis and Frank R. Spinning as commissioners. In addition to the Tacoma Railway & Power Company, between 200 and 250 of the strikers, including the seven men whose discharge by the company precipitated the strike, were named as respondents. The employees were made parties to the action in order that they may state their side of the controversy in the hearing that will decide whether or not the company must proceed with the operation of its cars. Attorney General Tanner concludes that the commission has power to act upon the city of Tacoma's demand that it take a hand in the matter.

When the hearing came up before Judge C. M. Easterday in the Superior Court on July 26 an affidavit of prejudice was filed against Judge Easterday by attorneys for the company and the hearing on the application was set for July 27 in Judge William Chapman's court.

Charging conspiracy and intimidation, the Tacoma Railway & Power Company, in connection with the suit brought by the State Public Service Commission, on July 26 filed in the Superior Court injunction proceedings against F. A. Hoover and Edward McMorrow, international organizers of the Amalgamated Association. The company charges in its complaint that on July 16 union organizers entered into an unlawful conspiracy to compel its employees to cease working, and by threats of violence and other methods of intimidation, induced a large number of men men to go out on strike.

The company further charges that the two organizers are engaged in a conspiracy to prevent the operation of the company's cars, and asks that Hoover and McMorrow be enjoined in common with the striking employees named in the original suit.

## Strike in Springfield, Ill.

### Violence Follows Strike by Which Men Seek to Enforce Demands for Union Recognition and More Pay

A strike was declared on the Springfield (Ill.) Consolidated Street Railway on July 25. Many of the men not long in the employ of the company were induced recently to join a local branch of the Amalgamated Association in that city and they went out to enforce demands made on the company for recognition and for an increase in wages. Most of the men who have been with the company for a long time remained loyal, and with them as a nucleus an effort was made to restore service at once. Considerable disorder followed as a result of the strike. One man was shot and at least two others are known to have been injured.

Shortly after midnight on July 25 A. D. Mackie, manager of the company, obtained an injunction through Circuit Judge E. S. Smith, restraining the strikers from interfering with the company's employees or the operation of cars. A warrant was also issued for Jerre Burdette, a union organizer, charging him with malicious mischief. The following day Burdette was arrested. In the meantime, however, a motorman of the company had been shot, presumably by strikers or strike sympathizers.

The men in Springfield now receive 21 cents an hour for the first year and are advanced until they reach the maximum of 30 cents an hour. The men who went out have demanded recognition of the union and a scale of wages calling for 23 cents an hour as the minimum pay and 35 cents as the maximum.

## Extension of Railway in Madras

A project for the extension of the electric railway in Madras has been under consideration for some time past and although not definitely decided on as yet, it seems likely that it will be eventually undertaken. The following from a recent issue of the Madras *Mail* may be of interest in this connection:

"We understand that the extension of the Madras tramways down the Mount Road and along the Bodyguard Lines depends very largely on the question of the widening of the Government House and Penitentiary bridges. Designs for doing this are now being prepared, but up to the present time nothing has been settled as to how the work is to be financed."

Any firms interested in the foregoing should address the chief engineer of the Madras Electric Tramway, Ltd., Vepery, Madras.

## Norfolk Booming

### Government Activities in and Around Norfolk and Portsmouth Affect Virginia Railway & Power Company

Government activities in and around Norfolk and Portsmouth have resulted in an enormous demand on the Virginia Railway & Power Company for additional service. The community has been transformed over-night from a fairly progressive and thriving municipality to a beehive of industry. Thousands of workers and great crowds of pleasure seekers have forced the company to place into service every available piece of equipment. Lines which heretofore were running through sparsely settled suburban districts on a forty-five minute schedule are now being operated on a two-minute headway.

#### TWENTY NEW CARS TO MEET DEMANDS

Foremost among the government's enterprises was the taking over of the site of the old Jamestown exposition, situated on Hampton Roads, about 10 miles out of Norfolk, and transforming it into a naval base for use in training the new army. Work of preparing this base was begun on July 5. About 2500 men are employed by the various contractors and it is the contractors' intention to increase this force as fast as the men become available. Travel between Norfolk and the naval base has become enormous. Lines that had been built for the purpose of serving the Jamestown exposition, and since the closing of that attraction used but little on account of lack of patronage, have been overhauled and service is now about on a par with that rendered during the exposition. Rush order has been placed for twenty new steel cars of the latest design, for use on these lines, to take care of the heavy traffic, and it is hoped that this new equipment will be delivered in time to provide service for the section of the new army which is to occupy the site in September.

In addition to the many men employed at the naval base, the navy yard on the Portsmouth side of the river has more than doubled its force in the past few months, and the government has also undertaken extensive repairs and additions to its naval hospital, marine barracks and naval magazine, all on the Portsmouth side, and thousands of men are engaged in these activities. Additional service has been installed on practically all lines to take care of these workers, and it has also been necessary to put on earlier service on some lines to accommodate the men who are reporting for work an hour earlier than usual.

The company has had to meet terrific demands from all sources for increased transportation facilities, and labor troubles for the past two weeks interfered more or less with the elaborate plans for taking care of the situation. However, with the settlement of the strike and the return of the men to work, the program of the company is rapidly maturing and practically all demands for service are being met.

## Hearings on St. Louis Compromise

The Board of Aldermen of St. Louis, Mo., on July 27 adjourned until Sept. 21, after a fight to hold it over until Aug. 17. At the meeting on July 27 the public utilities committee reported it would not be able to submit its recommendations regarding the two pending bills to compromise the United Railways litigation for at least six weeks. Mayor Kiel was instructed, in the resolution of adjournment, to call a special session upon ten days' notice if the public utilities committee reported either bill favorably before Sept. 21.

The first public hearing on the two bills that have been proposed for the settlement of the differences between the city and the company was held on July 25. President McCulloch of the United Railways said that the ordinances had been prepared by the representatives of the city. He favored the ordinance providing for the partnership arrangement with the city, being quoted to the effect that "with the city's help we can do many things that we cannot do alone." It is expected that the public hearings will be continued during the summer despite the adjournment of the Council until the fall.

## Richmond Company Seeks Relief

The so-called Grundy resolution came up for consideration before the finance committee of the Council of Richmond, Va., on July 17. It was voted to reject the resolution. The measure had for its purpose the granting of relief to the Virginia Railway & Power Company from some conditions under which it operates that have become quite burdensome to the company. The Grundy resolution called for a straight 5-cent fare on all cars, the elimination of school and labor tickets as well as the strip of six tickets sold for a quarter. In return it was proposed by Mr. Grundy to place a franchise license tax of 10 per cent on the gross receipts of the company. T. S. Wheelright, president of the company, said that he was not prepared at this time to report the proposal favorably to the board of directors of the company. He said that the 10 per cent tax would mean about $100,000 in revenue to the city, but would make the fare return 4½ cents instead of 5 cents. He referred to the jitneys that were cutting into the receipts of the company and suggested that something might be done by the City Council in this direction.

In commenting on the matter in an editorial headed "Our War Time Traction Problems," the Richmond *Leader* said in part:

"Though Colonel Grundy's ordinance died a-borning it does not follow that the city will refuse to remedy any serious injustice from which the Virginia Railway & Power Company may show itself to be suffering by reason of the war. For while we have both corporation baiters and corporation worshippers, in Council and out, we have thousands of citizens in Richmond who will insist upon a square deal for every man and every man's property. These citizens will act the moment they are convinced."

## Testimony in Buffalo Arbitration

### Conductor Abandons Car in Busy Street—Threat of Strike Unless He Is Reinstated

Considerable testimony has been taken by the board of arbitration appointed on July 21 to hear the grievances between the International Railway, Buffalo, N. Y., and its union platform employees. All of the testimony was in connection with the discharge of a union conductor, who is an officer of the union, for an alleged violation of two company rules. The first charge is that he abandoned his car in the street without waiting for his relief conductor and the second charge is that he neglected to turn in his day's receipts after completing his run.

Bert L. Jones, vice-president and general manager of the Niagara Gorge Railway, Buffalo, N. Y., represents the International Railway on the board; John B. Kolb, a motorman, appears for the union, and Frank X. Schwab, a wholesale liquor dealer, was agreed upon as the third arbitrator. Thomas Penney, vice-president and general counsel of the International Railway; John O. Weigel, general superintendent of transportation of the company; E. G. Connette, president of the company, and George W. Barker, superintendent of the Cold Spring carhouse, appeared for the railway. The union was represented by its business agent.

It developed during the taking of testimony that the discharged conductor had completed his day's run about 2.30 o'clock on the afternoon of May 31 and left his car standing in the street at a busy intersection without waiting for his relief conductor. The discharged man then went into a near-by lunchroom and ordered lunch. He did not turn in his day's receipts until almost nine hours later when he was located by one of the company's division superintendents. The man was discharged by Edward Schlant, assistant city superintendent of the company, upon the recommendation of company officials.

The union of which the discharged conductor was a member demanded the man's reinstatement. This was refused by the company. A vote was taken and the men agreed to strike on July 21. The company suggested that the entire matter be referred to W. D. Mahon, international president of the union. The union refused to allow its international officer to arbitrate the matter, and it was agreed to appoint a board of three to arbitrate the grievance.

## City Dads Sorry

### Electric Railway Built Around Town on Refusal of Franchise Renewal

One of the first interurban franchises to be granted in Ohio was that through the town of Berea to the Cleveland, Southwestern & Columbus Railway in 1892. This was the first franchise that the company received and was the first to expire. More than two years ago the Southwestern Company began negotiations with the town for a renewal of the contract, but any grant the town officials were willing to make was so restricted with paving, sprinkling and various other burdens upon the company that E. F. Schneider, general manager of the company, decided, after all negotiations had failed to bring about a reasonable settlement, to build a line around the city. Accordingly before the negotiations for the renewal of the grant ceased the company began to secure options on right-of-way. The town officials evidently thought the company was not sincere in its threat to build around Berea. Finally the options were exercised and track was laid on a 3-mile route encircling the city. All through cars now traverse the line without running into Berea.

A small section of line within the town is operated under a separate franchise and the company is required to run a few cars a day over this. Only certain local cars are backed into the town, but the station located on this piece of track has been closed and a new station built on the new right-of-way. The work of tearing up the tracks of the company within the town was begun by the company, but this was stopped through an injunction secured by the town officials.

### BEREA ISOLATED

Berea, with a population of about 3000, is now without a railroad station. Freight which was formerly brought into the center of the town by the interurban must now be hauled a distance of more than half a mile. Property values along the line have declined 25 per cent. Naturally, the people of the town are very much concerned and several attempts have been made to renew negotiations with the company, but the latter has no intention of changing its policy. So far as traffic is concerned, the company has not felt any decrease from cutting Berea off its line. The construction work for the new right-of-way cost the company $125,000, but it would have been necessary to spend $60,000 in track renewal had the franchise within the town been renewed.

## Fire in Coal Bunkers

A fire which started from spontaneous combustion of the coal in storage in the Newport power station of the Cincinnati, Newport & Covington Railway, Covington, Ky., recently, proved to be very hard to extinguish and resulted in a loss to the plant of about $10,000.

About 420 tons of coal had been stored for several months in the two bunkers over the boilers, one covering ten boilers and the other four. Natural gas is used as fuel, and the coal is used only in an emergency. The fire was discovered about 9.30 p. m. and was not under control until about 2 a. m. It was almost impossible to get at it with any water until the entire roof and coal-carrying structure over the bunkers had been burned away. The fire departments of Newport, Covington and Cincinnati responded to the call. The boilers were kept in operation during the fire, but the station was otherwise shut down and isolated.

Through the timely work of soldiers stationed nearby considerable damage to the engine room was avoided. Several lines of small hose manned by the soldiers were run from the fire pumps in the station to the engine room, and as the fire broke through the eaves and roof at various times it was quickly extinguished. Meantime the soldiers had torn up tents and spread them over the machines in the engine room to protect them from damage by water. About one-half of the coal in the bunkers was consumed before sufficient water could be got into the bunkers to extinguish the fire. The two-motor electric coal carrier, the telpher over the bunkers, the skylights and roof structure over the bunkers were completely destroyed.

## Cleveland to Initiate Terminal Grant

The machinery for initiating the subway and underground terminal ordinance of Mayor Davis of Cleveland, Ohio, has all been arranged. It will be necessary to secure the names of 5000 voters to the petition for submission of the ordinance to the electors.

Munson A. Havens, secretary of the Chamber of Commerce; E. H. Roberts, secretary of the Cleveland Advertising Club, and Fielder Sanders, street railway commissioner, constitute a committee to prepare advertising matter and instructions for those who circulate the petitions.

The plans provide for the presentation of the petitions to the City Council on Aug. 27, the first meeting after the summer vacation. If the Council fails to act favorably on the ordinance before Oct. 6, the question will be submitted to the voters at the regular election on Nov. 6.

The members of the Council who voted against the ordinance on July 16 are basing their arguments on the request of the United States Government that cities should not undertake improvements that are not absolutely needed or issue bonds for non-essential things.

## New Contract with Men in Everett

The likelihood of an electric railway strike in Everett, Wash., disappeared July 26 when a three-year working agreement with the Puget Sound International Railway & Power Company, a subsidiary Stone & Webster corporation, operating in Everett, was signed by a committee of the trainmen, and Manager D. C. Barnes, in behalf of the company. The agreement will not expire until July, 1920. The company and the men issued the following statement:

"For the purpose of assuring a continuous and uninterrupted public service to the citizens of Everett and vicinity and to adjust all questions arising between car service men and the company, a three-year contract has been negotiated in which the men agree not to strike in consideration of the wage and working conditions agreed to by the company. No man was asked to sign by any one selected by the company, or by any man with authority over others. Submission of the agreement to the individual men was handled entirely by representatives elected by a majority of the men. Our mutual relations have been entirely harmonious in the past and this agreement insures a continuation of this condition in the future."

## Toronto Wage Board Meets

The board of conciliation appointed to adjust the question of wages and conditions of service at issue between the Toronto (Ont.) Railway and its employees held a preliminary meeting at the city hall, Toronto, on Monday, July 30. It was expected that regular sittings would be commenced during the week. The board consists of three members, Duncan McDonald, Montreal, representing the Toronto Railway; D. A. Carey, Toronto, appointed by the men, and Judge Colin G. Snider, Hamilton, who was chosen by the Minister of Labor, Ottawa, and appointed chairman of the board.

## Nickel-Penny

The caption above indicates how the Salem *News* announced the recent fare increase on the Bay State Street Railway, Boston. The *News* said:

"A very pretty wedding, the culmination of a romance that had its inception at the State House some months ago, took place in this city Sunday, when Nickel, the youngest son of Mr. and Mrs. Silver, was married to Penny, the youngest daughter of Mr. and Mrs. Dollar. The single ring service was used. The wedding was performed by the Massachusetts Public Service Commission on the Bay State cars. The wedding was a public one and was attended by thousands of people as the young couple were very well known here, having visited this city in more prosperous times. The bride was becomingly attired in a copper colored gown. After a brief wedding trip the newlyweds will make their home in this city."

**Increase in Wages in Savannah.** — The Savannah (Ga.) Electric Company has increased the wages of its trainmen 2 cents an hour.

**Jersey Company Increases Wages.**—The conductors and motormen in the employ of the Jersey Central Traction Company, Keyport, N. J., have received an increase of 2 cents an hour and will receive time and a half for all overtime.

**Increase for Geneva Men.**—The Geneva, Seneca Falls & Auburn Railroad, Inc., Seneca Falls, N. Y., has granted an increase in wages to all car men of 2 cents an hour, bringing the scale to 24, 26 and 28 cents an hour. Carhouse men receive an increase of $5 a month.

**Service Resumed in Watertown.**—The Black River Traction Company, Watertown, N. Y., has replaced its employees who went on strike recently and has resumed service. The company refused to meet the demands of its old men for recognition of the union.

**"Journal" Editorial Republished.**—The *Tramway Bulletin*, published by the Denver (Col.) City Tramway, has republished in its issue for June the editorial "What Is Ahead of the Electric Railway Industry?" which appeared originally in the ELECTRIC RAILWAY JOURNAL of June 23, page 1127.

**New Offices for Bay State.**—The Bay State Street Railway, Boston, Mass., has moved its offices from 84 State Street to 245 State Street, a new office building overlooking the harbor. By the elevated line on Atlantic Avenue, which passes the door, the offices are but a few minutes from South Station.

**Cleveland Railway Protests New Tax Valuation.**—Again the Cleveland (Ohio) Railway has taken the valuation made by the State Tax Commission to the Common Pleas Court. The commission set a tax value of $27,048,000, but the company claims its taxable property will not amount to more than $20,000,000.

**Service Resumed at Lima.**—Threatened trouble on July 27 caused H. G. Gilpin, general manager of the local lines of the Ohio Electric Railway at Lima, Ohio, to withdraw the cars at night, after operating them successfully through the day. A policeman rode with the motorman on each car. No trouble occurred during the day.

**Another Coal Purchase Reported.** — The Commonwealth Power, Railway & Light Company, Grand Rapids, Mich., is reported to have purchased a three-quarter interest in a coal mine in Logan County, W. Va., the other quarter being owned by Columbia Power, Railway & Light Company. Production is running at the rate of 300,000 tons a year. Reserves are estimated by engineers at between 9,000,000 and 10,000,000 tons.

**Increase in Wages on Syracuse & Suburban Railroad.**—The wages of the trainmen in the employ of the Syracuse & Suburban Railroad, Syracuse, N. Y., have been advanced 1½ cents an hour retroactive to May 1. This advance is the same as that fixed in the conciliation award for the men on the Syracuse, Lake Shore & Northern Railway and the Syracuse & Northern Electric Railway, Inc., referred to in the ELECTRIC RAILWAY JOURNAL of July 21, page 116.

**Increase in Pay on Utah Line.**—Under the terms of an agreement reached between W. A. Whitney, general manager of the Ogden, Logan & Idaho Railway, Ogden, Utah, and a committee of seven employees, the men will receive an increase in pay, varying from 12 to 40 per cent. Changes in working conditions have also been agreed upon. The increase in pay goes to the interurban and city line employees and the shop men. The schedule of the increase will be arranged according to the agreement.

**Partial Service Only.**—E. E. Downs, president of the Alton & Jacksonville Railroad, Alton, Ill., announced recently that owing to the weakened condition of some of the bridges of the company between Godfrey and Jerseyville and the need for exchanging heavy cars for lighter cars, it would be necessary to discontinue passenger service between Alton and Jerseyville until further notice. The hourly service between Alton and Godfrey will remain practically as it is at the present time, omitting the tripper, which leaves at 5.30 o'clock in the evening.

**Increase in Wages by Washington-Virginia Railway.**—The Washington-Virginia Railway, Washington, D. C., on Aug. 1 put into effect the following increased wage scale for motormen and conductors: Less than one year, 26 cents an hour; second year, 27 cents an hour; third year, 28 cents an hour; fourth and fifth years, 29 cents an hour; sixth and seventh years, 30 cents an hour; eighth, ninth and tenth years, 31 cents an hour; over ten years, 32 cents an hour. This is the fourth increase in wages since July 1, 1914.

**Richmond Bonus to Men Increased.**—Announcement was made on July 13 by the Virginia Railway & Power Company, Richmond, Va., to the effect that the bonus of 2 cents an hour to motormen and conductors would be increased to 5 cents an hour, effective on July 16. This is the third raise which has been made voluntarily by the company since the war began and the second increase within the last four months. This last action taken by the company will make an additional increase in the payrolls of approximately $125,000 for the year.

**Women Likely to Replace Men in Detroit.**—It is quite likely that in the shifting condition due to the war more women will be employed by the Detroit (Mich.) United Lines. In fact the company now has more women in service than formerly through placing several of them in positions as cashiers in the carhouses, where they are performing the work in a most satisfactory manner. Women may in fact eventually be employed as cashiers on the trail cars—preferred employment because of the ease of the work and the remunerative return for services—if war conditions seem to justify it.

**South Bend Strike Declared Off.**—The strike of the employees of the Chicago, South Bend & Northern Indiana Railway Company, South Bend, Ind., has been declared off. The strike has long since been a thing of the past so far as the company is concerned. The issues involved were reviewed in the ELECTRIC RAILWAY JOURNAL for May 5, page 839; May 12, page 885; May 19, page 930; May 26, page 975; June 2, page 1019. Only the men on the local South Bend lines were affected. A board of mediation appointed by the Governor failed to bring about an agreement between the company and the men.

**Organization of Pacific Railway Club.**—The Pacific Railway Club, which was organized early this year with headquarters at San Francisco, Cal., has commenced the publication of its proceedings in monthly pamphlet form. A. H. Babcock, consulting electrical engineer of the Southern Pacific Company, is president, and G. H. Binkeley, valuation engineer United Railroads, San Francisco, is first vice-president of the club. The governors include W. R. Alberger, vice-president and general manager of the San Francisco-Oakland Terminal Railways. Headquarters have been opened in the Phelan Building, San Francisco.

**Philadelphia Negotiations Progressing.**—Negotiations are said to be progressing favorably toward a settlement of the differences between the city of Philadelphia, Pa., and the Philadelphia Rapid Transit Company over the terms for the operation of the city's new high-speed lines by that company. Many of the conditions of the new lease have been considered in conference between W. S. Twining, director of transit for the city, and A. L. Drum, consulting engineer for the company. Nothing official has been made public. The first regular session of Councils will be held on Sept. 20. It is understood, however, that the advisability of calling a special session of the Councils has been discussed.

**Transfer Interchange Suggested.**—The Port Commission of Seattle Wash., has instructed Attorney C. J. France to draw up a resolution, offering interchange transfer privileges with the public ferry systems to the East Waterway, the West Waterway and West Seattle, to the Lake Burien division of the municipal electric railway and the Puget Sound Traction, Light & Power Company. The Port will retain 40 per cent of the fares, giving 60 per cent to the other parties to the proposed arrangement. The commission is now providing two regular ferry services on Elliott Bay, one to West Seattle, and the other to the West Waterway, while a third service is being furnished to the East Waterway, to accommodate the 2000 workers at the Duthie shipbuilding plant.

**Use of Women for Conductors in Newark Not Yet Formally Considered.**—In answering an inquiry put to him by the Newark *Call* about the possibility of the Public Service Railway using women conductors, John L. O'Toole, assistant to the president of the company, is reported to have answered: "You can make as good a guess as we can. The possibility of such an emergency as would call for the employment of women on the back end of cars has been thought of by Public Service Railway, and has been mentioned among the officials in an informal manner, but that is as far as it has gone up to this time. We are just about like every other big concern in these uncertain times, when war happenings may change one condition after another over night. We do not know what is ahead of us, in the same sense that we were able to look ahead in normal times and prepare accordingly. Therefore we must be ready to meet any new condition that may arise in the conduct of the many and varied ramifications of our business."

**Promoting Athletics in Baltimore.**—Announcements have already begun to be made by the United Railways & Electric Company, Baltimore, Md., in connection with the promotion of social activities among the employees of the company, referred to originally in the ELECTRIC RAILWAY JOURNAL of June 23, page 115. The company has canvassed the tastes of the employees with respect to their preference in regard to athletics and an announcement has been made with respect to swimming. Announcements in regard to tennis and quoits will be made later. A blank was sent to the employees with the different amusements listed, and those who were solicited were requested to note on the blank the extent of their interest and the extent of their training T. A. Cross, president of the company, has expressed a willingness to provide suits and bathroom accommodations at Bay Shore Park for those who take up swimming. Novices and beginners will be instructed and contests will be arranged. Entries for swimming have been divided according to sex and then classified as expert swimmers, good swimmers but not experts, beginners and finally those who have not yet tried swimming. Entries in one class will be permitted to qualify for another class.

**Stock Offered to Employees.**—The Cities Service Company, New York, N. Y., put a new profit-sharing plan into operation on Aug. 1. The management has set aside $2,000,000 of preferred and $1,000,000 of common stock for subscription by the workers on terms governed by the length of service of the subscribers. An employee who has been in the organization less than a year may subscribe for stock equal in par value to 50 per cent of his yearly income, with increases from this level as the period of employment in case of other employees lengthens. An employee, for instance, who has been with one of the subsidiaries between three and four years, may take stock equal to 80 per cent of his income. Limitations have been placed on the high-salaried men to prevent too large subscriptions. The money invested by a subscriber will be used to buy both preferred and common stock. Payments will be due in sixty equal monthly instalments, making the stock fully paid for in five years. The employee who subscribes gets the common stock at par, which has a current market value of about $280 a share, and the preferred, with a current value of $85 a share, is also taken at par. An investment of $300 on these terms gives a subscriber stock with a market value of about $450.

## Program of Association Meeting

### National Association of Purchasing Agents

The annual congress of purchasing agents, under the auspices of the National Association, will be held at Pittsburgh, Pa., on Oct. 9, 10 and 11. The program includes business sessions for the mornings and visitation and inspection of industrial work during the afternoons. The secretary of the association is E. B. Hendricks, 129 Lafayette Street, New York, N. Y.

# Financial and Corporate

## Annual Report

### Northern Ohio Traction & Light Company

The comparative income statement of the Northern Ohio Traction & Light Company, Akron, Ohio, for the calendar years 1915 and 1916 follows:

| | 1916 | | 1915 | |
|---|---|---|---|---|
| | Amount | Per Cent | Amount | Per Cent |
| Operating revenue: | | | | |
| Railway department | $3,981,588 | 77.0 | $3,127,035 | 80.4 |
| Electric department | 1,188,853 | 33.0 | 763,714 | 19.6 |
| Total | $5,170,441 | 100.0 | $3,890,751 | 100.0 |
| Operating expenses, taxes and depreciation: | | | | |
| Operating expenses | $2,602,837 | 50.3 | $2,092,499 | 53.8 |
| Taxes | 268,141 | 5.2 | 220,511 | 5.6 |
| Depreciation | 295,000 | 5.7 | 60,000 | 1.6 |
| Total | $3,165,978 | 61.2 | $2,373,010 | 61.0 |
| Gross income | $2,004,463 | 38.8 | $1,517,741 | 39.0 |
| Income charges | 619,520 | 12.0 | 628,309 | 16.1 |
| Net income | $1,384,943 | 26.8 | $889,432 | 22.9 |

The gross earnings of the company in 1916 showed a gain of $1,279,690 or 32.9 per cent, while the operating expenses, taxes and depreciation advanced $792,968 or 33.4 per cent, so that the gross income increased $486,722 or 32.1 per cent. In addition to the $295,000 for depreciation of road and equipment included in expenses, a profit and loss charge of $350,000 was made for this item. Similar provision was also made for $290,000 for injuries and damages, in addition to $198,616 included in expenses, and $30,000 was set aside for contingencies. Refinancing costs written off totaled $94,929. After taking in the prior surplus, making such charges and paying $271,106 in preferred and $450,000 in common dividends, the surplus as of Dec. 31, 1916, amounted to $1,106,624.

The increase in gross earnings was mostly caused by a gain of $782,732 or 26.7 per cent in passenger earnings, $30,590 or 28.0 per cent in freight earnings and $425,137 or 55.6 per cent in light and power earnings. All divisions of expenses showed increases, the amounts being as follows: Maintenance of way and structures, $244,206 or 79.3 per cent; maintenance of equipment, $12,132 or 3.4 per cent; power operation and maintenance, $244,699 or 61.5 per cent; conducting transportation, $122,750 or 17.9 per cent; general, $121,549 or 29.2 per cent, and taxes, $47,630 or 21.6 per cent.

The total expenditures for additions and improvements during 1916 were $1,483,753. In this amount was included $348,902 for track, roadway and structures, $501,060 for power houses, substations and equipment, and $357,498 for cars and equipment. The gross railway earnings per mile of road in 1916 were $22,547, and per mile of single track, $16,296.

## Duluth Company Liable for Paving

The Supreme Court of Minnesota announced a decision on June 29, holding that the Duluth Street Railway must pay the extra cost in paving streets in cases where an additional width in the pavement was made necessary by reason of the presence of the street railway tracks and the operation of cars. The test case was brought on the Ninth Street paving job. This pavement was laid 42 ft. wide from curb to curb where the electric railway tracks are. For a portion of the distance paved there are double tracks and over the rest there is a single track. The court held that the company was liable to pay for 10 ft. of the 42 ft. paved where it had double tracks, and for 5 ft. where it had a single track. The city had contended that the company should pay for 16 ft. where a double track was laid. The sole question raised was the construction of the company's franchise of 1881. Section 6 provides that in cases "where other than animal power are used the company shall be required to pay only so much of the expense as is made extra by reason of the street railway company." The city contended that the company should be required to pay for the additional width of the street pavement made necessary by reason of the presence of the tracks and operation of the railway. The company contended that it should be required to pay only the extra cost of the pavement over what it would cost to lay the same pavement if the rails were not there. Since 1881 the company has made payment on the theory that it was not liable for any additional width of the street than that around the rails. The franchise, under which the test suit was brought, covers the downtown, west end and east end sections. The company is operating under separate franchises at Lakeside and West Duluth, and the conditions that obtain in these portions of the city were not involved in the suit.

## Suit Over Cars Withdrawn

The Public Service Commission for the First District of New York has been advised by its counsel that the writ of certiorari, obtained by the New York Railways for the purpose of reviewing the determination and order of the commission upon the application of that company for approval of an issue of bonds to finance the acquisition of 175 new "stepless" cars, has been withdrawn by the company and the proceeding instituted by the service of the writ has been discontinued. The matter has been held open pending the making up of a detailed balance sheet of the company, inasmuch as there was unadjusted a large number of unsettled claims growing out of the receivership, the value of which was indeterminate. It was said at the offices of the commission that it was deemed not unlikely that the New York Railways will later apply for leave to present additional evidence, covering matters which have come to its knowledge in connection with the making up of that balance sheet, as basis for approval of the issuance of more than $640,000 of bonds thus far approved. The company has lately expressed its interest in the establishment of a fair and adequate rule whereby the 4 per cent bonds may be used for needed development of the property.

## Suit Over Bridge Rights Likely

### Seattle Mayor Directs Corporation Counsel to Enforce Collection of Part of Cost of New Bridge

Mayor H. C. Gill of Seattle, Wash., has directed Corporation Counsel Hugh M. Caldwell to bring action "as soon as possible" to enforce collection from the Puget Sound Traction, Light & Power Company of the $60,917 fixed by the City Council as the company's share of the cost of the construction of the new Fremont Avenue Bridge, and the two other charges assessed, the $333 a month for the operation of the bridge and the 1 cent per kilowatt-hour for power consumed by cars in crossing the bridge. The Mayor charges that the Puget Sound Traction, Light & Power Company has refused to comply with the provisions of the ordinance specifying what the company should pay and that although it has used the bridge continuously since its opening on June 15, "it still refuses to recognize its obligations to pay."

The offer of the company to pay $625 a month and one-third the cost of operation to the city as a rental for the use of the new Fremont Avenue Bridge was refused. The proposal that the rental be submitted at once to arbitration was also rejected by the special committee of the Council. Mayor Gill and Councilmen Moore and Erickson joined in making the suggestion that the company accept the compromise of $900 a month rental, the city to furnish the current to be used in operating the cars across the bridge at 1 cent per kilowatt-hour. A. W. Leonard, president of the company, and James B. Howe, general counsel, declared that this amount was much too high, particularly in view of the low return that the company has received for many years past on its investment. President Leonard's proposal that it be made a condition of the arbitration that a decision be reached within thirty days after the appointment of the board, and that his company meanwhile would make a payment of $1,000 as the first month's rental was rejected by the committee.

**Albia Light & Railway Company, Albia, Iowa.**—The Albia Light & Railway Company, which was reorganized last year by Guy M. Walker by issuing to the holders of the old bonds 70 per cent of their holdings in new bonds and 30 per cent in 6 per cent preferred stock, has declared the first quarterly dividend of 1½ per cent on the preferred stock, and announces that the funds are already on hand out of which to pay the second dividend three months from now. Bondholders, who deposited with the protective committee, are now getting practically the same income return from the new securities as they were getting from the old securities before the receivership.

**Boise (Idaho) Railway.**—The Boise Railway has been incorporated with a capital stock of $200,000 by B. W. Oppenheim, W. E. Pierce, Thomas R. Hamer and Donald Miller as the successor to the Boise Railroad, Ltd., the property of which was sold under foreclosure recently as noted in the Electric Railway Journal of July 21, page 120, to David Miller and W. E. Pierce. Mr. Miller owns 1996 of the 2000 shares of stock. Mr. Miller is president of the company, Mr. Pierce vice-president and Mr. Hamer secretary and treasurer.

**Boston (Mass.) Elevated Railway.**—The Massachusetts Public Service Commission, which on May 21 authorized the West End Street Railway to issue $1,581,000 of three-year 6 per cent bonds to meet a similar issue which matured on Aug. 1, has sanctioned an increase to 7 per cent in the interest rate because of the inability of the company to find a ready market for the 6 per cent bonds at par. The board said: "Under the terms of the lease of the West End Street Railway by the Boston Elevated Railway all issues of bonds of the West End Street Railway must be sold at not less than par. It now appears that the West End Street Railway, after inviting bids, has been unable to sell the bonds at the rate of interest authorized by the order of May 21, and since it appears that in order to enable the company to sell bonds the rate of interest must be increased." The bonds are being offered by Lee, Higginson & Company at 102 and accrued interest, to yield 6¼ per cent.

**Chambersburg, Greencastle & Waynesboro Street Railway, Waynesboro, Pa.**—The directors of the Hagerstown & Frederick Railway, Frederick, Md., have voted to acquire control of the Chambersburg, Greencastle & Waynesboro Street Railway and its allied interests, including the Waynesboro Electric Light plant and the Mercersburg, Greencastle and Waynesboro turnpike.

**Cleveland & Chagrin Falls Railway, Cleveland, Ohio.**—Common Pleas Judge Phillips at Cleveland has appointed Robert D. Beattie, secretary and general manager of the Cleveland & Chagrin Falls Railway, receiver for the company. The appointment was made at the request of the Guardian Savings & Trust Company, Cleveland, Ohio, representing the holders of $251,900 of first mortgage 6 per cent bonds of the company. The trust company alleged that the continuous operation of the road would be interrupted if a forced sale of the property were permitted. The trust company makes the claim that the railway is not in a position to pay the judgment of $50,000 awarded to a Mrs. Stroup and that the case in which it was rendered is pending before the court of appeals in a proceeding to have the common pleas ruling reversed. The $50,000 verdict, which precipitated the receivership, was obtained by Mrs. Stroup in a damage suit to recover for personal injuries, which she said she sustained on July 19, 1915, when an automobile in which she was riding was wrecked by a car of the railway.

**International Traction Company, Buffalo, N. Y.**—E. H. Rollins & Sons and Parkinson & Burr, New York, N. Y., are offering for subscription at 98¼ and interest, to yield 6.65 per cent, $2,000,000 of collateral trust 6 per cent three-year gold notes of the International Traction Company, dated Aug. 1, 1917, and due Aug. 1, 1920. The International Traction Company owns the entire stock of the International Railway. The notes are authorized to the amount of $5,000,000 and are outstanding to the amount of $2,000,000. The outstanding notes are further secured by a supplemental indenture made by other interests pledging with the trustee $2,667,000 of refunding and improvement mortgage 5 per cent gold bonds of 1962 of the International Railway.

**Lisbon (Portugal) Electric Tramways.**—The result of operations of the Lisbon Electric Tramways, Ltd., for the calendar year 1916 was a net profit of £51,020. During the year the company carried 76,620,194 passengers as compared to 67,101,249 in 1915. The operating expenses increased out of all proportion, however, owing to the higher cost of coal and other supplies and labor. Efforts were made to secure an increase in fare, but owing to city and government opposition the attempt was temporarily abandoned. Steps in this connection are being taken this year.

**Northumberland County Traction Company, Sunbury, Pa.**—By a decree of presiding Judge Cummings Field in the Northumberland County Courts, the property of the Northumberland Traction Company is ordered to be sold unless a mortgage of $400,000 is satisfied before Aug. 6. The Philadelphia Trust Company, trustee for the bondholders, is the plaintiff. Interest accrued amounts to $89,055 and sale is ordered to be made in Philadelphia.

**Rochester, Syracuse Eastern Railroad, Syracuse, N. Y.**—The sale of the Rochester, Syracuse & Eastern Railroad, which was included in the system of the Empire United Railways, Inc., will take place on Aug. 28. It is expected that the property will be bid in by the bondholders and the reorganization take place at once. The bondholders' protective committee's plan for reorganization has been accepted.

**Southern Illinois Railway & Power Company, Harrisburg, Ill.**—The property of the Southern Illinois Railway & Power Company, of which John I. Beggs, St. Louis, Mo., is president, has been sold to the Middle West Utilities Company for $720,000, subject to $740,000 of first mortgage 5 per cent bonds. The company operates railway lines between Eldorado, Wasson, Muddy, Harrisburg, Domstock, Ledford and Carrier Mills, Illinois. It owns 17 miles of track.

**Steubenville, East Liverpool & Beaver Valley Traction Company, East Liverpool, Ohio.**—The Ohio Public Utilities Commission has approved the consolidation of the Steubenville & East Liverpool Railway & Light Company, the East Liverpool Traction & Light Company and the Ohio River Passenger Railway under the name of the Steubenville, East Liverpool & Beaver Valley Traction Company. The Steubenville & East Liverpool Railway & Light Company and the East Liverpool Traction & Light Company are authorized to dispose of their lighting plants to the Buckeye Power Company, and the latter is authorized to issue $3,750,000 stocks and bonds for the purchase of the plants of the two companies. The proposed consolidation plan was referred to in the Electric Railway Journal of July 7, page 343.

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## Electric Railway Monthly Earnings

| Period | | Operating Revenue | Operating Expenses | Operating Income | Fixed Charges | Net Income |
|---|---|---|---|---|---|---|
| HUDSON & MANHATTAN RAILROAD, NEW YORK, N. Y. | | | | | | |
| 1m., June, | '17 | $503,651 | *$245,200 | $258,450 | $217,165 | $41,285 |
| 1 " " | '16 | 476,959 | *210,273 | 266,686 | 217,661 | 49,025 |
| 6 " " | '17 | 3,134,312 | *1,455,087 | 1,679,224 | 1,303,145 | 376,079 |
| 6 " " | '16 | 2,961,214 | *1,290,407 | 1,670,807 | 1,291,038 | 379,769 |
| PADUCAH TRACTION & LIGHT COMPANY, PADUCAH, KY. | | | | | | |
| 1m., May, | '17 | $23,265 | *$18,201 | $5,063 | $7,472 | †$2,409 |
| 1 " " | '16 | 24,203 | *16,706 | 7,496 | 7,158 | 337 |
| 12 " " | '17 | 310,441 | *231,374 | 79,067 | 86,778 | †7,712 |
| 12 " " | '16 | 299,054 | *182,072 | 116,982 | 88,806 | 28,175 |
| PENSACOLA (FLA.) ELECTRIC COMPANY | | | | | | |
| 1m., May, | '17 | $25,313 | *$15,644 | $9,669 | $7,801 | $1,868 |
| 1 " " | '16 | 23,844 | *13,373 | 10,471 | 7,709 | 2,762 |
| 12 " " | '17 | 291,587 | *170,101 | 121,485 | 92,990 | 28,495 |
| 12 " " | '16 | 274,438 | *152,313 | 122,125 | 88,147 | 33,978 |
| PHILADELPHIA & WESTERN RAILWAY, UPPER DARBY, PA. | | | | | | |
| 1m., June, | '17 | $52,185 | $27,948 | $24,237 | $12,526 | $11,711 |
| 1 " " | '16 | 45,420 | 20,295 | 25,125 | 12,530 | 12,595 |
| 12 " " | '17 | 538,137 | 266,770 | 271,366 | 150,472 | 120,894 |
| 12 " " | '16 | 491,488 | 234,818 | 256,669 | 150,349 | 106,320 |
| PORTLAND RAILWAY, LIGHT & POWER COMPANY, PORTLAND, ORE. | | | | | | |
| 1m., May, | '17 | $474,433 | *$265,308 | $209,125 | $177,102 | $32,023 |
| 1 " " | '16 | 445,223 | *256,694 | 188,529 | 181,925 | 6,604 |
| 12 " " | '17 | 5,647,205 | *3,057,131 | 2,590,074 | 2,178,108 | 411,966 |
| 12 " " | '16 | 5,457,872 | *3,068,941 | 2,388,931 | 2,196,617 | 192,314 |
| PUGET SOUND TRACTION, LIGHT & POWER COMPANY, SEATTLE, WASH. | | | | | | |
| 1m., May, | '17 | $762,662 | *$460,938 | $301,724 | $191,342 | $110,380 |
| 1 " " | '16 | 644,795 | *415,238 | 229,556 | 184,454 | 45,101 |
| 12 " " | '17 | 8,689,133 | *5,290,269 | 3,398,863 | 2,248,576 | 1,150,287 |
| 12 " " | '16 | 7,670,305 | *4,911,848 | 2,758,457 | 2,196,064 | 562,392 |

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*Includes taxes. †Deficit.

# Traffic and Transportation

## Compromise in Fare Case

### Middlesex & Boston to Give Six Months' Trial to Modified Fare Schedule Establishing 6, 7 and 8-Cent Fare Units

At a hearing before the Massachusetts Public Service Commission on July 26 it was announced that the Middlesex & Boston Street Railway, Newtonville, Mass., and most of the leading municipal representatives who appeared in the pending fare case had agreed to give a modified rate schedule a six months' trial. The conferees included representatives of Wellesley, Framingham, Lexington, Newton, Waltham and Ashland. General recognition of the company's need of additional income appeared to exist among the representatives of the principal cities and towns concerned, and the plan agreed upon is based upon the establishment of fare units according to the density of traffic. The hearing on this case, held on June 11, was reviewed on page 1114 of this paper for June 16.

The plan is not expected to solve the company's financial problem, according to a statement by A. A. Ballantine, counsel for the road, but it is accepted for the trial period as a step in the right direction. It is estimated that an increase in revenue of about $65,000 will result from the new schedule. Six, 7 and 8-cent fares are to be charged.

### DETAILS OF THE TRIAL SCHEDULE

On the Newton Corner-Newton Lower Falls line, the Newton Corner-Norumbega Park line and on the six principal lines in Waltham the fare unit will be 6 cents, no tickets being acceptable. When transferring from any of these lines to a 7-cent line, 1 cent will be charged for a transfer. A free transfer will be issued to those who transfer from one of the 6 or 7-cent lines to another. On the main lines of the company in Commonwealth Avenue, Newton, running west of Lake Street, Chestnut Hill, and on the crosstown lines in Newtonville the fare unit will be 7 cents, with free transfers to the 6-cent lines. On the Newton lines books of twenty tickets will be sold for $1.20. No transfers will be given on such tickets.

On the Newton boundary-Needham Junction line and on the Needham-Wellesley line the unit of fare will be 8 cents with free transfers from the latter to the main line at Wellesley Square. On the Newton Lower Falls-Natick-Framingham line including the Framingham-Hopkinton line, the cash fare is to be 7 cents, with tickets sold at the rate of twenty for $1.20. No transfers are to be issued on these tickets and passengers wishing to transfer from the Wellesley line to the Needham line must pay 2 cents for a transfer. The fare on the Cochituate and Saxonville ends of the lines in this district will be 8 cents and also on the Westboro-Hopkinton line. The company desires to establish a 7-cent fare unit on the Lexington lines with an 8-cent unit on the Lexington-Woburn line. School tickets are to be sold on all lines at one-half the unit of fare.

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## Far-Western Jitneys to Secure Bonds

Jitney drivers in the State of Washington will soon be able to obtain the $2,500 bond required by State law, according to Stanley G. Morrison, president of the Morrison Company of Seattle, general agent for the Republic Casualty Company of Pittsburgh, who will write the bonds. Bonds have been issued in Spokane and Everett, and filed with the Industrial Commission at Olympia. No bonds were issued in Seattle and Tacoma before the electric railway strike ended, and the temporary methods of transportation ceased. They will be issued only to members of the Auto Drivers' Union.

The Republic Casualty Company has a capital stock of $500,000 and a surplus of $263,000. The admittance of the company to do business at this time is of unusual interest as the recent strikes in Seattle and Tacoma have opened a great field of activity to the jitney. The last company that handled jitney insurance business terminated in a receivership. The jitney men tried to organize a mutual company but were unable to furnish the required security.

Jitney men in Portland, Ore., are to be bonded by the Golden State Indemnity Company of San Francisco, a company organized by jitney, taxicab and "for hire" car owners about one year ago. It is a stock company organized under the laws of Oregon, and its bonds have been approved by City Commissioner Wells. E. W. Rossman, secretary-treasurer of the Chauffeurs' Union, states that the company is fully able to write the bonds of all the jitney men in Portland. He states that the report of the operation of the company for the past six months shows that it paid all indemnity losses and expenses and had a surplus of $4,242. The requirement of bond of $2,500 applies to all jitneys, taxicabs and "for hire" cars in Portland.

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## Two Fare Units Proposed

### Springfield Street Railway Asks Massachusetts Commission for Right to Establish Intermediate 6-Cent Fare Zone

In a petition to the Public Service Commission of Massachusetts, filed on July 30, the Springfield Street Railway requested authority to establish a two-unit fare program, differing considerably from previous plans to increase revenue which have been submitted to that body. The present fare unit on the system is 5 cents. It is proposed to retain this unit in the urban center of Springfield within a radius of 2 miles. Beyond this general limit a 6-cent zone will be established, followed by a second 5-cent fare zone. Thus, the sections of higher traffic density will receive a lower rate, while the suburban territory lying between Springfield and the important surrounding cities of the central Connecticut Valley will bear its proper share of the cost of service. Retention of the 5-cent fare in the urban zone of 2-miles radius also will enable the company to meet jitney competition more satisfactorily, although efforts have been under way for some time to secure an ordinance which will put the jitney traffic under satisfactory regulation.

The proposed 5-cent fare limits outward from the city are the intersection of Berkshire Avenue and Boston Road, on the State Street trunk line; the New England Westinghouse plant, East Springfield; East Longmeadow town line; Agawam Bridge; Westfield line, fare limits as at present, but transfers to be withdrawn beyond town line; Chicopee city line and Springfield Country Club. The fare will be increased to 15 cents from Springfield to Holyoke, 10 cents being charged to the Holyoke city line. A second 5-cent fare is to be collected at the Connecticut State line on both the Springfield-Hartford interurban routes. For Chicopee and Chicopee Falls, where the regular fare is to be 10 cents, the company proposes to make a concession by selling commutation tickets in lots of twelve for 96 cents. In general, the fare unit is to be raised to 6 cents on the country lines.

### PRESIDENT WOOD DESCRIBES COMPANY'S NEEDS

President C. V. Wood supplemented the petition by a statement to the effect that the company is now selling transportation at less than cost and that it must obtain increased revenue or go into bankruptcy. He pointed out the following percentage increases in the price of materials since 1914: Car axles, 145; car wheels, 26 to 40; coils, 87; cold-rolled steel, 208; high-speed steel, 345; trolley wheels, 67; wire, 135; steel poles, 130; rails and coal, 100 each. Mr. Wood's statement was, in part, as follows:

"By pocketing your pride you can make last year's old straw hat do for this year, but when our rail or wire is worn out we must replace them regardless of cost. To continue to sell transportation at less than cost means bankruptcy for us, which in turn means a receiver, who will only operate such cars as show a paying return. This means a large reduction in the service. To sell transportation at a fair profit means satisfactory service for you. It will attract investors, who provide the money for new equipment and extensions, all of which means prosperity for both of us. We need additional revenue and we need your co-operation in securing it; you need satisfactory service—think it over."

## Atlantic Shore Asks Increase

The Atlantic Shore Railway, Sanford, Me., has applied to the Public Utilities Commission for authority to increase its revenue by adding three fare zones. The new schedule, which becomes effective on Aug. 18, provides for an additional fare zone between Biddeford and Kennebunkport town house, one between West Kennebuck and Sanford and one between Wells and York Beach. Under this arrangement the fare between Biddeford and Sanford would be increased 12 cents, and also that between Biddeford and Portsmouth, the fare in each zone being 6 cents instead of a 5-cent unit as formerly.

It is hoped by the management that the new schedule will reduce the road's deficit, which is increasing from month to month because of the high operating cost. The business of some parts of the Atlantic Shore line shows a steady increase, while on others it is falling off owing to the great increase in the number of automobiles that are owned and operated along its lines. Besides an increased cost of from 20 to 200 per cent for materials required in the service, the increases in wages have amounted to 31 per cent within a comparatively short time. These facts are held to be legitimate reasons for higher rates.

## Regulation for Auto-Bus Lines

Regulations for the control of auto-stage lines competing with electric railways and steam railroads, and giving intermittent service in competition with established stage lines, were discussed recently before the Public Utilities Commission of Utah. It was argued on the part of established auto-stage lines that regulations should be made to limit competition with concerns and individuals engaged in regular service, and automobile owners should be prevented from engaging in transportation business except on particular occasions, such as on paydays at the mines and smelters. It was suggested that the commission establish a schedule of rates to be charged.

H. F. Dicke, general manager of the Utah Light & Traction Company, Salt Lake City, declared it to be unfair to allow the auto transportation companies to enter in direct competition with the electric railways and not require them to share a portion of the expense of paving. The matter of requiring the auto-bus companies to file a bond or to take out liability insurance for the protection of the public was also discussed. Liability insurance was held by some to be preferable to a bond on the ground that recovery for accident would be quicker and more assured.

## Niagara Gorge Inquiry Closed

### Engineers Find Failure of Retaining Wall Due to Improper Construction and Effect of Excessive Moisture

The Niagara County investigation into the wreck on the Niagara Gorge Railroad, Niagara Falls, N. Y., near the Whirlpool Rapids on July 1, which was reviewed, in part, on page 79 of the ELECTRIC RAILWAY JOURNAL for July 14, was closed on July 25. The last part of the testimony was introduced by Julius Freshee, city engineer of Lockport; Charles O. Gettman, a civil engineer of Buffalo, who has been retained by the railway to reconstruct the retaining wall at the scene of the washout, and other engineers who investigated the retaining wall after the wreck. All of the engineers agreed that "the cause of the wreck was due to improper construction of the retaining wall, and the effect on it of excessive moisture and seepage."

Mr. Gettman was the principal witness at the continuation of the inquest. He said he examined the embankment on the day after the wreck and found the soil on which the retaining wall was built to be crumbled rock and earth that through the years had slid from the sides of the gorge to the river to form the bank. He said there was practically no bedrock on which the wall could have been constructed and gave as the cause of the accident "instability of fill owing to excessive moisture." The fill behind the dry stone wall was Rochester shale, a plastic earth that when moist would seep through crevices. It was Mr. Gettman's opinion that the wall collapsed from the force of the moistened plastic fill and that it did not wash out from the base. He said there were slight traces of Portland cement. Charles R. Barnes, electric railway expert for the Public Service Commission, and his assistant, R. G. Winans of Albany, both asked Mr. Gettman if, in his opinion, it was good practice to use a dry stone wall in such a place, to which he replied in the negative. The witness said the company's tracks have been moved back farther from the water's edge since the accident and have been temporarily "shored up."

After the completion of the inquest officials of Niagara County and inspectors for the Public Service Commission made a trip over the Great Gorge route from Lewiston to Niagara Falls. The decision in the case has been reserved.

## Pennsylvania Jitney Men Fined

The Public Service Commission of Pennsylvania has announced that it has imposed fines of $100 on ten jitney operators in Scranton who had failed to obey the order of the commission requiring them to cease rendering service. The commission announced that suit will be brought in the Dauphin County Court in case the fines are not paid.

These cases were called to the attention of the commission by complaints filed against the operators. Hearings were held and orders issued by the commission that the men cease operating. An appeal was taken to the Superior Court and at the May term the decision of the commission was upheld. The jitney operators in question have refused to obey the ruling and the commission is now proceeding to enforce its order. This action of the commission indicates the beginning of a vigorous policy on its part to enforce its determinations against jitney operators, and it is expected that it will be followed by similar action in other parts of the State.

## Six-Cent Fare Hearing

A petition by the Norton, Taunton & Attleboro Street Railway, Norton, Mass., successor to the Norton & Taunton Street Railway, for authority to establish a general fare increase was heard by the Massachusetts Public Service Commission on July 27. Lothrop Withington of Boston represented the company. It is proposed to raise the fare unit throughout the system from 5 cents to 6 cents.

At the hearing the company introduced evidence to show that its finances are in an unsatisfactory condition. The gross operating revenue decreased from $66,261 in 1914 to $64,927 in 1916; gross operating expenses increased from $55,568 to $64,900; taxes rose from $1,655 to $1,732; maintenance of way increased from $6,009 to $10,724; maintenance of lines increased from $1,398 to $1,655, while the cost of conducting transportation increased from $17,458 to $17,812. General and miscellaneous expense increased from $3,908 to $7,236 and damages increased from $418 to $1,080. It was stated that the company's power plant is considered too large for its service and studies have been made of the cost of buying power.

The hearing was closed, and the commission suspended the proposed fare increase until Sept. 1, pending a decision in the case.

**Charge for Transfers Likely.**—The Fitchburg & Leominster Street Railway, Fitchburg, Mass., considers charging 1 or 2 cents for transfers instead of a 6-cent fare in order to meet rising operating costs, according to a statement made recently by W. W. Sargent, general manager of the company.

**Service Reduced Because of Labor Shortage.**—The operating schedule of the Cleveland (Ohio) Railway has been reduced seventy-five trips a day, most of which were run during the rush hours. Officials of the company state that this became necessary because of a shortage of men. Street Railway Commissioner Sanders said that it would mean quite a saving to the company.

**Bridgeton & Millville Fare Hearing.**—The Public Utility Commission of New Jersey has fixed Sept. 13 as the date for a hearing on the application of the Bridgeton & Millville Traction Company, Bridgeton, to discontinue issuing strip tickets effective Aug. 6. The tickets are sold at the rate of six for 25 cents and fifty for $2. The commission also suspended the effective date of the proposed change till Nov. 6 unless it decides in the meantime that the increased rate is reasonable.

**One-Man Cars Suggested in Muscatine.**—One-man cars have been suggested for Muscatine, Iowa, by officials of the Clinton, Davenport & Muscatine Railway, Davenport, as a method of reducing operating costs in that city, and the matter is now being considered by the City Council. J. G. Huntoon, general manager of the company, states that the road is being operated at a loss and that some means must be found to relieve the situation. A more frequent service is promised in return for permission to operate one-man cars.

**Railways Lose Against Auto Buses.**—Judge Trexler in the Superior Court has upheld the Public Service Commission of Pennsylvania in its recent decision granting certificates of convenience for the operation of auto-bus lines between points in Schuylkill County. The Union Traction Company, Philadelphia, and the Pottsville & St. Clair Electric Railway, Pottsville, had protested against issuance of the certificates. The court held that the bus lines were justified inasmuch as the electric railway cars are seriously overcrowded during the rush hours.

**Withdrawal of Tickets Refused.**—The Supreme Court of New Jersey has decided against the Trenton & Mercer County Traction Corporation, Trenton, N. J., in its move to abolish the selling of six tickets for 25 cents. In an opinion by Justice Swayze filed in the Supreme Court of that State he upholds the jurisdiction of the State Board of Public Utility Commissioners. The ruling, however, can be appealed to the Court of Errors and Appeals. The company has pending in the federal courts an action testing the ticket sale on constitutional grounds.

**Chicago & North Shore Adds Freight Service.**—Freight service from Milwaukee to the Great Lakes Naval Station and intermediate points, including Waukegan, Racine, Kenosha, Zion City and Libertyville, was begun on Aug. 1 by the Chicago, North Shore & Milwaukee Railroad, Highwood, Ill. The freight traffic on this road from Milwaukee to Burlington and East Troy and intermediate points, which was begun about a year ago, is much heavier than was expected, and is opening to Milwaukee merchants a field not reached before. The traffic department expects also to announce soon such service from Milwaukee to Watertown.

**More Skip Stops Proposed.**—Resolutions presented to the Common Council of Detroit, Mich., and now in the hands of the committee on public utilities for consideration will, if adopted, give skip-stop operation on several of the main lines of the Detroit United Railways in addition to those now enjoying this time-saving plan. The resolutions provide for the extension of skip stops to the following lines: Grand River, Michigan, Gratiot, Baker and Mack. As noted recently in the ELECTRIC RAILWAY JOURNAL, this company put skip-stop operation into effect on its Fort line on July 1 and on its Hamilton line one week later. This form of service had been in use on two other lines of the system for several months.

**Booklet to Commemorate Brady Medal Award.** — The Connecticut Company, New Haven, Conn., has issued an attractive booklet describing the safety work of the company in commemoration of the award of the Anthony N. Brady medal to it last year. Data as to the company's operating conditions, and an account of the efforts made to reduce accidents both to the public and employees are the salient features of the text. By way of illustration a picture of the company's model steel car is inserted as a frontispiece and maps of the Connecticut Company's system are inserted in the back. The front and back covers contain respectively full-size embossed reproductions in gold of the two faces of the medal.

**Universal Transfers Asked in Philadelphia.**—The Northwest Business Men's Association has filed a petition with the Public Service Commission of Pennsylvania asking that a universal transfer plan be adopted by the Philadelphia Rapid Transit Company. It is pointed out that free transfers are issued at some points, while at a much greater number of intersecting points a 3-cent transfer charge is made and that this often works an unjust discrimination. The petition concludes that "the rate of fare to all passengers who find it necessary to transfer from one of the cars of the common system to another car of the common system, in order to make a complete journey, should be a charge of not more than 5 cents."

**St. Louis Traffic Statistics.**—The report of the United Railways, St. Louis, Mo., for the quarter ended June 30, filed in the office of the City Register, shows fewer trips, more mileage and more passengers carried than in the corresponding quarter of 1916. The number of trips was 1,622,314, which was 18,800 fewer than last year. The mileage was 10,197,198, an increase of 161,851. The passengers carried were 63,262,929, of whom 1,107,288 were half fares. There was an increase of 2,210,276 whole fares and a decrease of 154,289 half fares. The net increase is 1,055,987. On week days the average number of cars in use was 1278, against 1259 last year; on Saturdays 1184, against 1199 last year, and on Sundays 808, against 795 last year. The city's share of the mill tax is $63,262, against $61,206 last year.

**Controlling Autoists in St. Louis.**—A campaign against reckless speeding of autos has been started in St. Louis, Mo. The St. Louis *Star* is supporting the movement, which has the co-operation of City Judge Hogan, Judge Kruger of the Criminal Court and the coroner. Chief of Police Young has instructed all patrolmen to arrest reckless drivers, and car men of the United Railways have been asked to report the license numbers of such violators. Richard McCulloch, president and general manager of the United Railways, has suggested that licensing of all drivers be based on mental and physical examinations and that accidents be a cause for revocation of permits. Mr. McCulloch said also that the extensive parking of automobiles in the downtown section of the city is not justified and is a great menace to safe transportation.

**Judgment Obtained for Jitney Accident.**—In a recent decision of the Washington State Supreme Court, the Pacific Coast Casualty Company, a jitney bonding company, was held liable for the death of a little girl caused by a 5-cent-fare automobile. Richard Burner, father of the child, sued the owners of the machine and the Pacific Coast Casualty Company, which had issued insurance policy on the car, for damages. Judgment of $1,500 was obtained in the King County Superior Court, but the court ruled that the bonding company was not liable because, according to terms of the policy, it was responsible only to "persons injured." The Supreme Court held that the child was not guilty of contributory negligence, that the automobile was running faster than allowed by law, and that its brakes were defective. It held also that the bonding company was liable and affirmed the decision of the lower court in regard to the owners of the car.

**Traffic Suggestions for Louisville.**—A committee of the Louisville (Ky.) Automobile Club, working on a new traffic ordinance for Louisville, believes that if drivers of vehicles are permitted to make a right-hand turn when semaphores are set against them, congestion of traffic will be relieved. Now they must stop unless the semaphores register "Go." The same committee has recommended the following as a section of a traffic ordinance to control the glaring-headlight evil: "It shall be unlawful to use on a vehicle of any kind operated on the public streets of the city of Louisville, or on any street, alley or highway, whether the same has been dedicated to public use or not, within the limits of the city of Louisville, any lighting device of over 4 cp., equipped with a reflector, unless the same shall be designed, deflected or arranged so that no portion of the beam of reflected light, when measured 75 ft. or more ahead of the lamps, shall rise above 42 in. from the level surface on which the vehicle stands under all conditions of load. Spotlights shall not be used except when projecting their rays directly on the ground or at a distance not exceeding 30 ft. in front of the vehicle."

# Personal Mention

**Charles Ruff**, master mechanic of the Lincoln (Neb.) Traction Company, has resigned.

**W. J. Trythall** has succeeded C. B. Brunner as claim agent for the Phillipsburg (N. J.) Transit Company.

**Donald Miller** is president of the Boise (Idaho) Railway, which is the successor to the Boise Railroad, Ltd.

**C. D. Rogers**, Boston, has been elected president of the Bristol & Norfolk Street Railway, Randolph, Mass.

**J. J. Callaghan** has been appointed superintendent of the Oshawa (Ont.) Railway, to succeed D. A. Valleau.

**William Hazen** has been appointed roadmaster for the Sarnia (Ont.) Street Railway to succeed R. M. Miller.

**R. J. Semsch** has been appointed auditor of the Wisconsin Railway, Light & Power Company, La Crosse, Wis.

**E. J. Lauder** has been elected vice-president of the Grand Forks (N. D.) Street Railway, succeeding C. C. Cowran.

**A. S. Guelich** has been appointed auditor of the Charleston (W. Va.) Interurban Railroad to succeed H. G. Freed.

**H. E. Clark** has been elected vice-president of the Indiana County Street Railway, Indiana, Pa., succeeding S. L. Eyre.

**A. W. Criss** was recently appointed superintendent of maintenance of way for the Butte (Mont.) Electric Railway.

**Thomas R. Hamer** has been elected secretary and treasurer of the Boise (Idaho) Railway, newly incorporated as the successor to the Boise Railroad, Ltd.

**M. S. Sloan**, general manager of the New Orleans Railway & Light Company, New Orleans, La., has been made vice-president and general manager of the company.

**J. B. Blaidlock** has resigned as master mechanic of the Atlantic City & Shore Railroad, Atlantic City, N. J., to become connected with the Lincoln (Neb.) Traction Company.

**Mrs. Sara W. Kulp** has been elected president of the Shamokin & Edgewood Electric Railway, Shamokin, Pa., succeeding G. Gilbert Kulp. Mrs. Kulp is the widow of ex-Congressman Monroe Y. Kulp, who had considerable interest in the stock of the company.

**Lawrence N. Siler**, a mechanical and electrical engineer of The J. G. White Management Corporation, New York, N. Y., has been assigned to the engineering staff of the Manila Electric Railroad & Light Company, Manila, P. I., which is being operated by the Management Corporation. Mr. Siler is a graduate of Cornell University.

**Byron T. Burt**, who for the last two years has been vice-president and general manager of the Rutland Railway, Light & Power Company, Rutland, Vt., has been appointed assistant to the chief executive of the Mexican Light & Power Company, Mexico City, Mex. Mr. Burt will assist in the management of the engineering and operating departments.

**H. K. Sherman**, general storekeeper at the Albion shops of the Michigan Railway for the last three years, has been appointed purchasing agent to succeed G. B. Ross, deceased. Mr. Sherman was formerly purchasing agent of the Michigan United Traction Company and previous to that time was assistant to the purchasing agent of the Toledo Railways & Light Company, Toledo, Ohio.

**H. R. Gore** has resigned his position as auditor of the Eastern Pennsylvania Railways, Pottsville, Pa., to accept a position with Haskins & Sells, public accountants, New York, N. Y. Prior to being assigned to that company he served as auditor of the Kentucky Public Service Company, Bowling Green, Ky., both of these utilities being under the management of The J. G. White Management Corporation, New York, N. Y.

**E. P. Peck**, heretofore superintendent of the department of tests and repairs of the Georgia Railway & Power Company, Atlanta, Ga., has been assigned to the new office of superintendent of operation. Mr. Peck now has supervision not only over tests and repairs, but also over the electrical equipment and operation of all stations and substations in the Atlanta district, and has general direction of the load dispatching of the entire system.

**H. H. Lunsford**, who resigned on Feb. 1 as superintendent of the Southwestern Traction & Power Company, New Iberia, La., has accepted a position as district superintendent of the United States Insurance Association of Ardmore, Okla., industrial department. Mr. Lunsford was formerly connected for several years with the Shreveport (La.) Traction Company as superintendent. In his new position he will be located at Okmulgee, Okla., and have jurisdiction over several towns in that district.

**W. C. Austin** has been transferred from the staff of traveling auditors of The J. G. White Management Corporation, New York, N. Y., to the position of auditor of the Eastern Pennsylvania Railways. This utility furnishes railway and electric service in Pottsville, Pa., and vicinity, and is operated by the Management Corporation. For a number of years Mr. Austin was treasurer and auditor of the Otsego & Herkimer Railroad, now the Southern New York Power & Railway Corporation, Cooperstown, N. Y.

**John Kelley**, who for the past twenty-three years has been chief district claim agent for the Bay State Street Railway, Boston, Mass., with headquarters at Quincy, has resigned on account of ill health. Mr. Kelley was instrumental in the establishment of the Weymouth & Braintree Street Railway and was its first president. He was at one time town moderator of Braintree and is prominent in the veteran firemen's organizations. Mr. Kelley will be succeeded by Robert Jones, who will have his headquarters at Brockton.

**August W. Munster** has been appointed purchasing agent of the Boston & Maine Railroad, which operates the Portsmouth (N. H.) Electric Railway and the Concord & Manchester Electric Branch, Concord, N. H., with office at Boston, Mass., succeeding B. S. Hinckley, who resigned to engage in private business. Mr. Munster is a graduate of the Massachusetts Institute of Technology, class of 1904. He was formerly employed in the mechanical departments of the Northern Pacific Railway and the New York, New Haven & Hartford Railroad, and has been general storekeeper of the Boston & Maine since 1911.

**G. W. Palmer, Jr.**, has resigned as first vice-president of the American Electric Railway Engineering Association on account of ill health. Mr. Palmer is electrical engineer of the Bay State Street Railway, Boston, Mass. He held a similar position in 1907 with the Boston & Northern Street Railway, when he was appointed chairman of the committee on car and car-house wiring of the Engineering Association. Since that time he has served on the committees on power generation, standards and power distribution and on the committee on electrolysis since its creation. Mr. Palmer was elected to the executive committee in 1913, second vice-president of the association in 1915 and first vice-president a year later.

**Clyde Taylor**, general counsel for the Kansas City (Mo.) Railways, has been elected vice-president of the company. Mr. Taylor has been general counsel of the Kansas City system since the resignation of John H. Lucas in April, 1916. He was formerly assistant counsel associated with Mr. Lucas during the receivership and reorganization of the Metropolitan Street Railway, Kansas City, the predecessor of the Kansas City Railways, Mr. Taylor was graduated from the University of Michigan. After practicing law for a time he acquired some experience in legal work for railroads, insurance companies and other corporations before he became connected with the Kansas City Railways. He will assume the duties of president in the absence of Col. P. J. Kealy, doing military service.

**J. H. Prior**, who has been chief engineer of the Illinois Public Utilities Commission, has left the service of the commission to open an engineering office in Chicago. He was assistant chief engineer of the commission previous to his appointment as chief engineer about two years ago. Mr. Prior was educated at the Armour Institute of Technology and the University of Chicago. In 1905 he was appointed engineer of design for the Chicago, Milwaukee & St. Paul Railway, and for the following nine years he was engaged in the designing of all classes of railroad structures for that company. During one year of that period Mr. Prior made valuations of the company's structures in Minnesota and South Dakota as required by regulatory bodies in those states.

## Obituary

**G. B. Ross**, purchasing agent of the Michigan Railway, Jackson, Mich., died at Saginaw on July 18. He formerly served as purchasing agent of the Saginaw-Bay City Railway, and in April, 1914, he was transferred to Jackson as purchasing agent for the Michigan Railway and the Saginaw-Bay City Railway.

**Jesse Hough**, former storekeeper for ten years in the maintenance of way department of the Indianapolis Traction & Terminal Company, Indianapolis, Ind., died at his home in that city on July 23. At the time of his death Mr. Hough was sales representative of the National Lock Washer Company. He was fifty-seven years of age.

**Frederick W. Mott**, a pioneer in electric railway work, died at his home in St. Louis at the age of sixty-eight. Mr. Mott was born in New York, but moved to Missouri early in life and afterward became State Senator. He was vice-president and manager of a horse-car line in Carondelet, Mo., now a part of St. Louis, and later was instrumental in organizing the Carondelet Electric Light & Power Company.

**Edward F. Wittler**, one of the early electric railway promoters in Seattle, Wash., died on July 26 at his home in that city at the age of sixty-six. Mr. Wittler was connected with the Yesler cable line in Seattle before the fire of 1889, which completely destroyed the property. The line was immediately reconstructed by Mr. Wittler and his associates. He later organized the Union Trunk Line system, of which he became president. Mr. Wittler was born in Germany and came to the United States when fourteen years of age.

**Albert F. Ganz**, professor of electrical engineering in the Stevens Institute of Technology, Hoboken, N. J., died suddenly on July 28. Mr. Ganz was born at Elberfeld, Germany, in 1872. He was graduated from Stevens Institute in 1895 and became an instructor of physics and applied engineering there soon afterward. He was made professor and head of the department of electrical engineering in 1902. Professor Ganz contributed generously to the development of engineering and was widely known for his research work on electrolysis. He was a fellow in the American Institute of Electrical Engineers and a member of several other engineering societies.

**Wilner E. Johnson**, engineer of car construction, New York Municipal Railway Corporation, died of heart failure on July 27, after having had a sudden attack on May 23. Only those who were intimately associated with Mr. Johnson appreciated the ability of the man of quiet, unassuming disposition, who began his apprenticeship as a draftsman at the Fifty-second Street shops of the Brooklyn Rapid Transit Company fifteen years ago, and who rose in that period to the successive positions of chief draftsman in 1907, engineer of car equipment in 1911 and engineer of car construction of the allied New York Municipal Railway Corporation in 1913. What his employers thought of him is indicated by the fact that when his health failed in 1909 he received nine months' leave of absence with pay. In 1912, under the direction of his department head, W. G. Gove, Mr. Johnson made a most striking study of car design in relation to speed of passenger interchange—a study which has since become a model for many others. Mr. Johnson's largest achievements for his company were the detailed working out of the Brooklyn center-entrance surface car and the New York Municipal side-door car; but also as a member of the American Electric Railway Association's committee on equipment in recent years he spared no effort to make the committee's researches of real value to the industry at large. Mr. Johnson, besides being a member of the American Society of Mechanical Engineers, also took great interest in the American Society for Testing Materials, specializing in the manufacture and treatment of steel.

# Construction News

Construction News Notes are classified under each heading alphabetically by States.

An asterisk (*) indicates a project not previously reported.

## RECENT INCORPORATIONS

***Boise (Idaho) Railway.**—The Boise Railway has been incorporated as the successor to the Boise Railroad, Ltd., sold under foreclosure recently. Capital stock, $200,000. Incorporators: B. W. Oppenheim, W. E. Pierce, Thomas R. Hamer and Donald Miller.

## FRANCHISES

**Ithaca, N. Y.**—The Ithaca Traction Company has filed a petition with the Public Service Commission asking permission to construct an extension of its railway in the village of Cayuga Heights and for approval of the exercise of a franchise received from that village.

**East Cleveland, Ohio.**—The East Cleveland Chamber of Commerce has recommended that the new franchise, approved by the City Council, be opposed by the electors at a referendum election. The Cleveland Railway, on the other hand, has stated that it will relay its track through the town and make all the improvements called for by the franchise as soon as possible, if a favorable vote is cast. The officers of the company desire to get the matter out of the way.

**Salt Lake City, Utah.**—A franchise for the construction and operation of a branch line of the Salt Lake & Utah Railroad has been granted the company by the Board of County Commissioners. The branch, in addition to connecting Magna with the main line of the electric railroad, will furnish means of transportation through sugar beet lands contiguous to the West Jordan sugar factory.

## TRACK AND ROADWAY

**San Francisco (Cal.) Municipal Railway.**—The contract for the placing of ties and the laying of tracks for the Twin Peaks tunnel has been awarded to Eaton & Smith for a consideration of $81,000.

**Valdosta (Ga.) Street Railway.**—This company has started work on tearing up the line from Pine Park to the Strickland Cotton Mills in preparation to putting in the belt line which is to connect with the West Hill Avenue line at Pear Street and with the North Patterson Street line at Ann Street. The additions and changes in the lines will open up a large amount of territory in the western part of the city, which is thickly settled.

***East St. Louis, Ill.**—A company has been organized to operate an electric railway over the Free Bridge at St. Louis, Mo. The new company contemplates leasing the right-of-way of the Southern Traction Company, which is now in the hands of a receiver. The latter company has a franchise to operate from Belleville, Ill., to East St. Louis. The incorporators are William P. Launtz, Clyde Allen and Albert E. Meints, East St. Louis, and William B. Tate, St. Louis.

**Rockford & Interurban Railway, Rockford, Ill.**—This company is considering the extension of its city lines in Rockford for the use of the interurban lines so that the cars of the latter can obtain entrance to the Koehler Building, corner of Mechanic and Galena Streets which the company is desirous of leasing for a freight and passenger depot.

**Terre Haute, Indianapolis & Eastern Traction Company, Terre Haute, Ind.**—The city line of this company in Crawfordsville, Ind., will probably be extended south from Wabash Avenue to Crawfordsville Junction on Oak Street, a distance of about half a mile.

**Frankfort, Ky.**—P. C. Phillip, representing an Eastern corporation which is not designated, has just completed an inspection of the route and conditions relating to the proposed construction of an electric railway from Frankfort to Shelbyville, Ky. Two routes are proposed. Mr. Phillip made a thorough inspection, talked to representatives of organizations in both Shelbyville and Frankfort and returned East to report to his company.

**Kentucky Traction & Terminal Company, Lexington, Ky.** This company has completed the transfer of its track from the north side to the center of Georgetown Street as far as the city limits, and is now running cars over the new track.

**Berkshire Street Railway, Pittsfield, Mass.**—It is expected that this company's extension from Lee to Huntington will be placed in operation by Aug. 1.

**Kansas City (Mo.) Railways.**—Work will soon be begun by the Kansas City Railways on its line from Eighteenth Street and Central Avenue to Kansas Avenue. The new line will connect with the west factory center of Armourdale. It will cross the new Eighteenth Street viaduct.

**United Railways, St. Louis, Mo.**—The United Railways has begun cutting down trees on the De Mun tract, preparatory to building the extension of its tracks to the Hamilton Avenue line. The extension will give additional transportation facilities to Hillcrest, which is at the northwest corner of Skinker and Clayton Roads.

**Southwest Missouri Railroad, Webb City, Mo.**—It is reported that this company, which is constructing an extension from Galena to Baxter Springs, will extend its line to Oklahoma City.

**Moncton Tramways, Electric & Gas Company, Ltd., Moncton, N. B.**—This company is reconstructing some of its track in Moncton in connection with paving being done by the city.

**Trenton & Mercer County Traction Corporation, Trenton, N. J.**—An extension will be built by the Trenton & Mercer County Traction Corporation to the heart of Trenton Junction. The line now extends to the outskirts of the village and the Philadelphia & Reading Railway has granted the company permission to lay its tracks in a tunnel to be built shortly.

**New York State Railways, Syracuse, N. Y.**—An automatic block signal system has been installed by the New York State Railways on its East Syracuse line on the single track between Greenways and the factory of the Benedict Manufacturing Company. The installation represents an expenditure of about $3,000.

**Black River Traction Company, Watertown, N. Y.**—This company contemplates the construction of an extension of its system following the completion of the Court Street bridge. The extension may include a line up Washington Street with a loop to the State Street branch, provided the necessary consents can be obtained from the property owners.

**Ohio Traction Company, Cincinnati, Ohio.**—Hamilton County Commissioners and the Ohio Traction Company have reached an agreement to the effect that the Glendale line will be moved to the center of the Springfield Pike from Carthage to the north corporation line in Wyoming. In return for this work the company will be permitted to use the new bridge over Millcreek at Woodlawn, provided it pays the cost of the equipment. The matter of paving between the tracks is to be settled by the company and the village of Wyoming.

**Wellston & Jackson Belt Railway, Jackson, Ohio.**—A communication from the Hocking Valley Railway states that steam service has been substituted for electric on the Wellston & Jackson Belt Railway, a subsidiary company.

**Youngstown & Sharon Street Railway, Youngstown, Ohio.**—Work has been begun by the Youngstown & Sharon Street Railway reconstructing its track on East Boardman Street with "Trilby" girder rail.

**Oklahoma Union Railway, Tulsa, Okla.**—A communication from the Interurban Construction Company, which has the contract to build an extension of this company's line from Tulsa to Sapulpa, states that about one-third of the line is completed and it is expected that the entire line will be completed by Oct. 1.

**Klamath Falls (Ore.) Municipal Railway.**—Construction work has been begun by Robert E. Strahorn, Portland, on the Klamath Falls Municipal Railway from Klamath Falls to Dairy, 20 miles. [June 30, '17.]

**Texas Electric Railway, Dallas, Tex.**—The City Commission of Dallas has granted the Texas Electric Company the right to construct tracks and buildings for an interurban express station at Young, Market, Wood and Jefferson Streets.

**Virginia Railway & Power Company, Richmond, Va.**—Arrangements are being made by the Virginia Railway & Power Company for the reconstruction of a large portion of its trackage in the Barton Heights-Ginter Park section at an early date. Double-track work along First Street to the Barton Heights viaduct is practically completed.

**Seattle (Wash.) Municipal Railway.**—The construction of the proposed elevated municipal railway on Railroad, Whatcom and Spokane Avenues, from Washington Street to the West Waterway, Seattle, will require the vacation of franchises held by the Chicago, Milwaukee & Puget Sound Railway and the Oregon-Washington Railroad & Navigation Company on Railroad Avenue, from a point 100 ft. south of King Street to Yesler Way. A committee will be appointed by the Council to negotiate with the two companies for revocation of such franchise, and for acquiring common user rights on tracks owned by the Columbia & Puget Sound Railway. A report from the Seattle Municipal Street Railway states that it will construct an extension of Division "A" to Ballard within the next six months.

**Washington Water Power Company, Spokane, Wash.**—Heavy steel rails for restoring its tracks on Monroe Street between Riverside Avenue and the Monroe Street bridge will be installed at an early date by the Washington Water Power Company, preliminary to the paving of the street.

**Tacoma (Wash.) Municipal Railway.**—Work will be begun Aug. 1 on the construction of the new municipal line to the Todd shipyards.

## SHOPS AND BUILDINGS

**Sand Springs (Okla.) Interurban Railway.**—Fire recently destroyed a large portion of the carhouse of the Sand Springs Interurban Railway, containing an electric motor car and six trailers. The loss is placed at $25,000.

**Puget Sound Traction, Light & Power Company, Seattle, Wash.**—The Department of Buildings, Seattle, recently granted to the Puget Sound Traction, Light & Power Company a permit for the construction of an oil storage tank, 100 ft. in diameter, at 1321 Greeley Street, to cost $28,000. The tank will be of reinforced concrete, and will have capacity of 15,000 barrels.

## POWER HOUSES AND SUBSTATIONS

**St. Joseph Railway, Light, Heat & Power Company, St. Joseph, Mo.**—This company will probably be in the market for a locomotive crane and 400 ft. of coal conveyor for use in its coal storage yard. In March the company purchased two seven-retort Taylor stokers, in May six 500-kw. transformers, and in June soot blowers for twelve boilers, flow meters for five boilers and a 20,000-gal. water softener.

**Trenton & Mercer County Traction Corporation, Trenton, N. J.**—The City Commission of Trenton, N. J., has adopted a resolution giving the Trenton & Mercer County Traction Corporation until Oct. 15 to remove its transmission cables and poles throughout the city under penalty of seeking individual indictments by the Mercer County Grand Jury. The commission claims that the company has been maintaining the transmission cables and poles without having obtained the necessary franchises.

**Western Washington Power Company, Seattle, Wash.**—The Hebb power site on the White River, owned by the Mountain Development Company, has been purchased by the Western Water Power Company, a subsidiary of the Puget Sound Traction, Light & Power Company, at a cost of about $1,000,000. The plant will be held for the present as an auxiliary and a reserve plant.

# Manufactures and Markets

Discussions of Market and Trade Conditions for the Manufacturer, Salesman and Purchasing Agent

Rolling Stock Purchases Market Quotations Business Announcements

## Plain Talk About Deliveries

### A Manufacturer of Electric Railway Materials Discusses the Problems of Meeting Deliveries

BY A RAILWAY SALES MANAGER

I have read with exceptional interest the article in the ELECTRIC RAILWAY JOURNAL entitled "Settling for Defective Equipment" (page 1211, June 30, 1917). Other articles on this important subject would be of service to manufacturers and purchasers. You have made a suggestion in the first article whereby the purchaser, if he compiles his losses accurately, is entitled to a fair adjustment for delayed shipments. I think, in fairness to the manufacturer, it would be well to bring out another phase of the manufacturing industry, which a great many of the purchasers do not appreciate.

#### RAW MATERIALS NOT CONTROLLED

The majority of manufacturers do not control their own raw materials and so they have to depend upon the purchase from other raw material producers, thus, when making promises of shipment, the manufacturers must base these on the promises given by the raw material manufacturers, and in most cases the delays of shipments of electric railway materials are due to failure to receive raw materials on time.

On the other hand, if a standardized product is being sold, then delivery failures are largely up to the manufacturer if he does not carry in stock reasonable quantities of the production materials. However, in the case of turbines, large railway motors, special control, etc., there is a belief among many of the manufacturing representatives, especially of the factory and engineering sections, that the railway industry as a whole should share pro rata with the manufacturers its portion of the development cost. Therefore if the manufacturer agrees to produce something that will effect considerable economies, he should not be penalized, if, due to no fault on his part, he did not meet the promised shipments.

It should also be borne in mind that manufacturers as a rule do not delay shipments merely because of lack of attention. Most manufacturers have to wait a long time for their money, and in order to turn over their funds as rapidly as possible, they are more anxious than the purchaser to make prompt shipments; but in a great many cases the raw material producers are working on a tonnage basis, and while they will give promises of shipments of special material, they do not apparently hesitate to incur delays of thirty or sixty days if it is found that in this way their tonnage rate will be maintained or increased.

#### SPECIAL DESIGNS CAUSE DELAYS

A great many of the raw material producers, during the past year or so, have been very slack in keeping to their promised shipments, especially so if the apparatus is any way special. This has imposed a very severe hardship on the manufacturers. Some producers when the manufacturer complains, will politely tell him that they would prefer to cancel his order and not bother further about it, etc. The best information or advice usually obtainable is—"We are quite sure that we can make shipment on a certain date, but in these times, this, that or the other may interfere with it, etc."

With this set of conditions confronting him the manufacturer in turn will allow a margin of thirty to sixty days on the producers' promise and will make promises to his customer that the fabricated product will be shipped at a certain time, only to find later on that he has been delayed several weeks and sometimes months by the raw material producers.

#### PENALTIES FOR DELAYS WON'T HELP

Of course, it might be argued that the manufacturers of the apparatus could in turn hold the raw material producers for damages, etc., but one must bear in mind that if the purchasers of the apparatus once started a systematic method of holding manufacturers for damages on account of delays in shipments, the manufacturers would naturally protect themselves in price and by longer deliveries. It is a well-known fact that the average factory will deliver according to promised shipping dates as nearly as possible. However shipping ahead of time in many instances results in holding up payment until the regular shipping date arrives because the purchaser had not provided for funds to make payment until he had received shipments. This works a financial hardship on the manufacturer.

I think the broad-minded spirit that you have suggested in your recent article is a splendid one, and I think a great deal could be written regarding the attitude of many purchasers on the question of claims of defects, etc., when as a matter of fact they are largely due to improper methods of maintenance and care, but the manufacturer has not backbone enough to tell the purchaser plainly where the difficulty lies, because he is immediately confronted with the statement that he is merely trying to step from under his responsibility and is making a big fuss over nothing.

## Railways Near Cantonments Order Cars

### Numerous Inquiries for Supplies—Prompt Deliveries Required on Rolling Stock Purchases—Large Demand for Second-Hand Equipment

The demands made upon electric railways in the vicinity of cantonments for immediate service, including in many instances the furnishing of light and power, are being met promptly. A number of the railways affected placed orders for equipment some time ago and are now receiving cars from the car builders. Other companies are now in the market for cars and a number of orders have been placed with deliveries promised in from four to five months. In cases where the companies cannot get deliveries in sufficient time for properly handling the traffic or have not the necessary funds to purchase new equipment, they are either remodeling old cars or buying second-hand equipment.

To take care of the traffic conditions that have been increased by the location of the new naval base at Pine Beach, the Virginia Railway & Power Company has just placed an order for twenty new steel cars. The contract calls for the delivery of these cars not later than Nov. 1. The Columbia (S. C.) Railway, Gas & Electric Company is building four semi-convertible cars for cantonment service and expects to buy four new cars. Among the companies which have purchased second-hand equipment are the Washington, Baltimore & Annapolis Electric Railroad. This company, as noted in the July 21 issue, has just purchased fifty-four trailer cars from the Long Island Railroad and has also placed an order for eight electric locomotives to be used for service to the cantonment at Admiral, Md. The Union Light & Power Company of Kansas City, Mo., recently purchased five trailers for its Fort Riley service and will place them in commission as soon as they are required. The Montgomery Light & Traction Company of Montgomery, Ala., has purchased six new all-steel, pay-as-you-enter cars and are therefore prepared to furnish a good service to the camp nearby. The San Diego (Cal.) Electric Railway is remodeling twelve 40-ft. cars and these are expected to be finished by the time the camp is opened. A number of railways have purchased passenger trailer cars, these companies including the Kankakee & Urbana Traction Company and the Scioto Valley Traction Company.

The majority of the companies are furnishing light and power and in most cases this necessitates the building of a transmission line and the installation of transformers, etc. Although in these times the railways are striving to get along on just as little as they possibly can, the railway supply men are receiving a number of orders on account of equipping cars for cantonment service, and all this helps to liven up what otherwise might be considered a quiet season.

## Railways Acquiring Coal Lands

In addition to the railways noted in last week's issue as purchasing coal mines or coal lands, the Commonwealth Power, Railway & Light Company, Grand Rapids, Mich., is reported to have purchased a three-quarter interest in a coal mine in Logan County, W. Va., the other quarter being owned by Columbia Power, Railway & Light Company. Production is running at the rate of 300,000 tons a year. Reserves are estimated by engineers at between 9,000,000 and 10,000,000 tons.

According to the latest report of the United States Geological Survey on the weekly production of bituminous coal and the causes of loss of working time, a slight increase in the percentage of full-time capacity realized in actual output is reported for the week ended July 14. The output amounted to 77.4 per cent as compared to 76.5 per cent for the week ending July 7. The per cent of full time lost on account of car shortage for the week ending July 14 was 15.9, on account of labor shortage and trouble, 3.4, and on account of mine disability, 3.9.

## Car Service Plans of War Board

Plans for the solution of present transportation problems have just been adopted by the Railroads' War Board, according to Fairfax Harrison, chairman of the board. It concerns the prompt movement of the thousands of cars required by the government to transport lumber and other supplies to the shipbuilding yards, the army cantonments and other mobilization points. The government will hereafter give advance notice to the War Board's Commission on car service whenever orders are placed for more than ten carloads of materials or supplies. It will also issue, where necessary, through its authorized representatives, orders to the railroads on which the supplies are to be shipped, instructing them to provide the number of cars ordered within the time specified and at the shipping points designated.

## Effect of War on Canadian Exports

Reports were prevalent a few weeks ago that the entry of the United States into the war in Europe had stimulated to a considerable degree electrical trade with Canada. While such reports may have been true for other manufacturing industries, a careful investigation has disclosed no material increase in electrical exports to Canada. In fact, in some instances it was found that America's entry into the war was a signal for decreasing trade. A number of projects were scheduled for development shortly, but simultaneously with the entrance of America into the war these plans were either abandoned or postponed indefinitely.

Of course, it must not be lost sight of that some of the larger American manufacturers have established Canadian factories or have connections in Canada in which they have substantial interests whereby goods of Canadian manufacture but identical in design with American goods are marketed in Canada. These plants, which are largely financed by American capital and buy probably most of their raw materials from the United States, have been established in Canada as a means to compete in the Canadian market without the necessity of having to pay import duty.

## Costs of Office Supplies Increase

A great deal has been written in these columns about the increases in the costs of electric railway equipment, but these costs are not the only ones which cause worry in the purchasing departments of the railways. One of the large railroad systems which operates a number of electric lines has called attention to the increases in office supplies. A good grade of water-marked bond paper two years ago sold for 7 cents a pound, but it is not possible to get this paper at double the price to-day. A few important items. all of which have been purchased in large quantities. are listed, showing prices paid two years ago, prices paid at the present time, and the percentage increase for the two years.

| | 1915 | 1917 | Per Cent Increase in Two Years |
|---|---|---|---|
| Copy ink, dozen quarts | $2.25 | $8.00 | 255 |
| Blue ink, dozen quarts | 2.00 | 4.50 | 125 |
| French ink, dozen quarts | 2.25 | 8.00 | 255 |
| Mucilage, dozen quarts | 2.50 | 4.40 | 76 |
| Blotting paper, 100 lb. | 7.00 | 14.60 | 108 |
| Manila wrap | 3.60 | 10.05 | 179 |
| Plain, per thousand | .51 | 1.27½ | 149 |
| Special mimo, per thousand | .55 | 1.25 | 127 |
| Carbon, per thousand | 2.50 | 3.80 | 52 |
| Paste, dozen | 2.75 | 5.20 | 89 |
| Pencils, copy grade | 3.00 | 6.00 | 100 |
| Folders, cap size, thousand | 3.40 | 7.20 | 112 |

## $7,000,000 of Porcelain Supplies Purchased in 1916

The value of porcelain electrical supplies marketed in the United States in 1916 was $7,034,420, an increase of $2,363,218 over 1915, according to the United States Geological Survey Department of the Interior. These wares were reported from ten states of which Ohio was the leader, reporting wares to the value of $2,181,026. New Jersey was second, with $1,674,093, and New York third with $1,623,433. These three states reported 78 per cent of the value of the entire output.

## NEW YORK METAL MARKET PRICES

| | July 26 | Aug. 3 |
|---|---|---|
| Prime Lake, cents per lb. | 26 | 29 |
| Electrolytic, cents per lb. | 26 | 29 |
| Copper wire base, cents per lb. | 36 | 36 |
| Lead, cents per lb. | 10¼ | 10⅞ |
| Nickel, cents per lb. | 50 | 50 |
| Spelter, cents per lb. | 8¾ | 8¾ |
| Tin, Straits, cents per lb. | 62½ | 63¾ |
| Aluminum, 98 to 99 per cent, cents per lb. | 57 | 56 |

## OLD METAL PRICES

| | July 26 | Aug. 3 |
|---|---|---|
| Heavy copper, cents per lb. | 24 | 23½ |
| Light copper, cents per lb. | 21 | 20½ |
| Red brass, cents per lb. | 19 | 19 |
| Yellow brass, cents per lb. | 16 | 15½ |
| Lead, heavy, cents per lb. | 8½ | 8½ |
| Zinc, cents per lb. | 6 | 6 |
| Steel car axles, Chicago, per net ton | $45.50 | $45.00 |
| Old car wheels, Chicago, per gross ton | $32.50 | $31.50 |
| Steel rails (scrap), Chicago, per gross ton | $43.00 | $43.00 |
| Steel rails (relaying), Chicago, per gross ton | $59.50 | $60.00 |
| Machine shop turnings, Chicago, per net ton | $17.50 | $16.50 |

## CURRENT PRICES FOR MATERIALS

| | July 26 | Aug. 3 |
|---|---|---|
| Rubber-covered wire base, New York, cents per lb. | 36½ | 36½ |
| No. 0000 feeder cable (bare), New York, cents per lb. | 36½ | 36½ |
| No. 0000 feeder cable (stranded), New York, cents per lb. | 33¾ | 33¾ |
| No. 6 copper wire (insulated), New York, cents per lb. | 33 | 33 |
| No. 6 copper wire (bare), New York, cents per lb. | 36 | 36 |
| Rails, heavy, Bessemer, Pittsburgh | $38.00 | $38.00 |
| Rails, heavy, O. H., Pittsburgh, per gross ton | $40.00 | $40.00 |
| Wire nails, Pittsburgh, per 100 lb. | $4.00 | $4.00 |
| Railroad spikes, 9/16 in., Pittsburgh, per 100 lb. | $5.00 | $7.00 |
| Steel bars, Pittsburgh, per 100 lb. | $4.50 | $4.50 |
| Sheet iron, black (24 gage), Pittsburgh, per 100 lb. | $8.35 | $8.35 |
| Sheet iron, galvanized (24 gage), Pittsburgh, per 100 lb. | $9.55 | $9.55 |
| Galvanized barbed wire, Pittsburgh, cents per lb. | $4.85 | $4.85 |
| Galvanized wire, ordinary, Pittsburgh, cents per lb. | $4.65 | $4.65 |
| Cement (carload lots), New York, per bbl. | $2.22 | $2.22 |
| Cement (carload lots), Chicago, per bbl. | $2.31 | $2.31 |
| Cement (carload lots), Seattle, per bbl. | $2.60 | $2.60 |
| Linseed oil (raw, 5 bbl. lots), New York, per gal. | $1.12 | $1.13 |
| Linseed oil (boiled, 5 bbl. lots), New York, per gal. | $1.13 | $1.14 |
| White lead (110 lb. keg), New York, cents per lb. | 12¾ | 12¾ |
| Turpentine (bbl. lots), New York, cents per gal. | 42 | 42½ |

## ROLLING STOCK

**St. Joseph Railway, Light, Heat & Power Company, St. Joseph, Mo.,** is in the market for twelve one-man cars.

**San Diego (Cal.) Electric Railway** is remodeling twelve 40-ft. cars to be used in connection with the cantonment near its property.

**Northern Ohio Traction & Light Company, Akron, Ohio,** through Hodenpyl, Hardy & Company, has placed an order for four 50-ft. freight trailer bodies and also for freight trailer trucks to equip these cars.

**Virginia Railway & Power Company, Richmond, Va.,** has placed an order for twenty new steel cars with the St. Louis Car Company for delivery between Oct. 15 and Nov. 1. These cars will take care of the increased traffic caused by the location of the new naval base at Norfolk, Va.

**Fort Wayne & Northern Indiana Traction Company, Fort Wayne, Ind.,** noted recently as being in the market for ten double-truck cars, has specified the following details for this equipment, which is being built by the St. Louis Car Company:

| | |
|---|---|
| Number of cars ordered | 10 |
| Date of order | April, 1917 |
| Date of delivery | Sept., 1917 |
| Builder | St. Louis Car |
| Type | Semi-convertible |
| Seating capacity | 52 |
| Weight (total) | 33,900 lb. |
| Bolster centers | 17 ft. 0 in. |
| Over bumpers | 42 ft. 0 in. |
| Over vestibule | 41 ft. 0 in. |
| Width over all | 8 ft. 7 in. |
| Rail to trolley base | 11 ft. 3 in. |
| Body | Semi-steel |
| Interior trim, | Birch stained light cherry |
| Headlining | Agasote |
| Roof | Arch |
| Air brakes | West. D-H-10 |
| Axles | Baldwin |
| Bumpers | Channel |
| Trimmings, | Bronze statuary finish |
| Conduits | Crouse-Hinds |
| Control type | West. K-12A |
| Couplers | None |
| Curtain fixtures | Ring No. 88 |
| Curtain material | Pantasote |
| Dest. signs | St. Louis Car |
| Door mechanism | St. Louis Car |
| Fare boxes | Cleveland |
| Fenders | H. B. life guards |
| Gears and pinions | Nuttall |
| Hand brakes | Peacock. no staff |
| Heaters | Peter Smith Electric |
| Headlights | Ohio Brass ZP. |
| Journal boxes | Symington |
| Lightning arresters | West. |
| Motors | West. No. 506—C2, inside hung |
| Paint | Builders standard |
| Registers | International |
| Sanders | Keystone traps and Ohio brass valves |
| Sash fixtures | O. M. Edwards |
| Seats, style | St. Louis reversible |
| Seating material | Rattan |
| Springs | Standard steel |
| Step treads | Feralun |
| Trolley catchers | Ohio brass |
| Trolley base | U. S. No. 15 |
| Trolley wheels | Moore Jones |
| Trucks, type | 9 cars, Baldwin No. 66-18-C; 1 car, St. Louis Car No. 119-B. |
| Ventilators | Garland |
| Wheels | 9 cars, 30-in. rolled steel; 1 car, 30-in. Davis |
| Special devices | Forsyth Bros. beadless brass sash, with brass side weather stripping |

## TRADE NOTES

**J. H. Flynn** has been appointed manager of the bucket department of the Blaw-Knox Company, effective July 1.

**Thomas Henderson** has retired from the Coxe Traveling Grate Company to become chief engineer for the Benjamin Iron & Steel Company.

**Alfred Spangenburg** has resigned from the S. L. Moore & Sons Corporation, Elizabeth, N. J., to accept a position as superintendent of the ordnance shop of the Mead-Morrison Manufacturing Company.

**Stephen Gardner** for thirteen years connected with the sales office of the Westinghouse Electric & Manufacturing Company, has resigned to accept a position as treasurer of Greenlee Foundry Company and its allied companies.

**Davis-Bournonville Company, Jersey City, N. J.,** announces that on Aug. 1 it will open a school at its plant for the instruction in oxy-acetylene welding and cutting practise of purchasers of its equipment.

**Singer, Reed & Taylor, Pittsburgh, Pa.,** have opened offices at 304 Wabash Building and will handle the sale of iron, steel, alloys and scrap metals.

**National Association of Purchasing Agents, New York, N. Y.,** will hold its annual congress at Pittsburgh, Oct. 9, 10 and 11. The program includes business sessions for the mornings and visitation and inspection of industrial works during the afternoons.

**John F. Card,** for the last eighteen years superintendent and designing engineer of direct-current machinery for Fairbanks, Morse & Company at Three Rivers, Mich., has resigned to go into the manufacturing business on his own account.

**W. J. Gillingham** has been elected vice-president of the Hall Switch & Signal Company with headquarters in New York City. He has been connected with this company since 1900, holding the positions of general agent, resident manager and general sales agent respectively.

**Phillips Wire Company, Pawtucket, R. I.,** announces that the business operated as the Phillips Insulated Wire Company will hereafter be conducted under the name Phillips Wire Company. The location of the business, policy and management will be the same as heretofore.

**Ingersoll-Rand Company, New York, N. Y.,** announces that at a meeting of the board of directors on July 25, J. H. Jowett, formerly general sales manager, was elected vice-president and that L. D. Albin, formerly assistant general sales manager, was appointed general sales manager. Mr. Jowett and Mr. Albin will continue to make their headquarters at the company's New York office, 11 Broadway.

**Laclede-Christy Clay Products Company, St. Louis, Mo.,** announces that it has recently acquired the long-established plant and good-will of the Beaver Valley Pot Company of Rochester, Pa., and will operate this department hereafter as the Laclede-Christy Company of Pennsylvania, Rochester, Pa. The company intends that its new product, L-C Beaver Valley Pots, shall enjoy an equal reputation with the L. C. company's tank blocks, bottom blocks, checkers and bonding clay.

## NEW ADVERTISING LITERATURE

**General Electric Company, Schenectady, N. Y.:** A leaflet descriptive of automatic control for small direct current motors.

**Crocker-Wheeler Company Ampere, N. J.:** Bulletin 181 superseding bulletin No. 156. Contains detailed information on motor-generator sets for all classes of service to which they are applicable.

**Portland Cement Association, Chicago, Ill.:** A booklet on "Bulk Cement," advising the common sense and economy in the use of this product. Describes and illustrates the various uses of this material and includes a number of users of bulk cement.

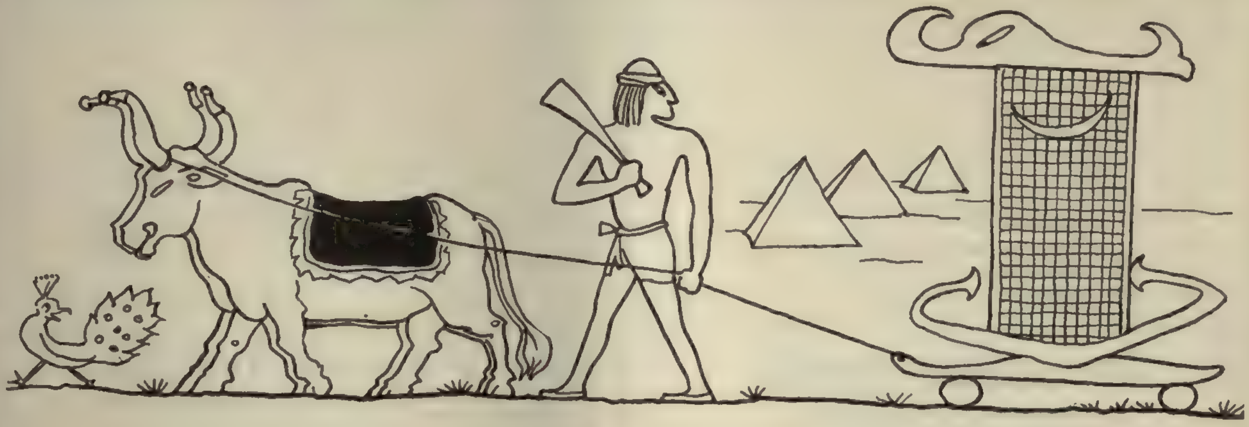
**Chicago (Ill.) Pneumatic Tool Company:** Bulletin No. 137 on its Chicago giant rock drill. Contains dimensions, weight, shipping measurements, prices, details of parts and illustrations of a number of jobs which have been completed with this type of drill.

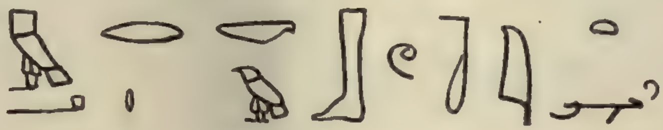
**Edison Storage Battery Company, Orange, N. J.:** Bulletin No. 600 on Edison storage batteries for industrial transportation. Describes and illustrates various applications of this battery. Contains general data and dimensions of batteries with details of costs.

**Horne Manufacturing Company, Brooklyn, N. Y.:** Bulletin on Sterling trolley bases, also a new bulletin describing miscellaneous electrical equipment that this company has acquired since taking over the Lord Manufacturing Company's business on the first of the year.

**Crouse-Hinds Company, Syracuse, N. Y.:** Bulletin No. 303 on Imperial floodlight projectors and reflectors. Gives in detail its type SD projector which is made in three sizes to be used with 9⅝-in. 12-in. and 16-in. reflectors and its type SC projector made only for use with a 16-in. reflector. Special and diffusing lenses are included. Mountings, lamps, resistances and special parts are described and listed. Full page illustrations showing scientific and practical arrangement of floodlight projectors for factory protection are given.

**Westinghouse Electric & Manufacturing Company, East Pittsburgh, Pa.:** Reprint No. 56 of the "Norfolk & Western Electrification from the Railroad Viewpoint." Contains two papers, the first "An Unusual Railway Electrification," by A. H. Babcock, consulting electrical engineer of the Southern Pacific Company. This paper was delivered before a recent meeting of the San Francisco section of the American Institute of Electrical Engineers. The second paper is by C. H. Quinn, chief electrical engineer of the Norfolk & Western Railway, which was read before the New York Railroad Club at its annual electrification meeting. In one of the final paragraphs on the results of electrification comparisons are given of electric and steam operation, showing the many economies in favor of the electrification scheme.





The above hieroglyphics might represent what the driver said when the starter at the Nile carhouse gave him a bad order car for that heavy run to the Pyramids. Evidently his "rolling stock," consisting of logs thrust across sledge runners, didn't need much in the way of brakes.

Times have changed since then. In these days of speed with **safety**, the brake equipment is just as important as the motive equipment, even if it does cost a lot less money!

The Improved Peacock Brake is not only the best but the simplest and most powerful of hand brakes.

Instead of a train of cumbersome, sluggish levers attempting to concentrate power at the brake shoe, the Peacock is **geared** at the proper ratio and dispenses with one full turn of the handle as well as hundreds of pounds of effort.

Through the entire operation the shoe pressure, governed by Peacock brakes, is brought to the motorman's hand in so direct and frictionless a manner that he at all times has air-brake efficiency in the control of his car—the same sense of safety, the same sure feeling of full command of the situation.

Be sure you are well posted on this hand brake question. Be cock sure. Be Pea-cock sure.

*Get the record of Peacock tests.*

National Brake Co.
Buffalo, N. Y.

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An organization prepared to handle all work which calls for the application of chemistry to electric railway engineering—such as the testing of coal, lubricants, water, wire insulation, trolley wire, cable, timber preservatives, paints, bearing metals, etc.
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is as much a reality as is the Art of Selling. Advertising of the right kind helps the *buyer* as much as it does the seller.

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The Service Department is ready to serve you, Mr. Manufacturer.

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of the City of New York

Capital, Surplus & Profits $1,635,000
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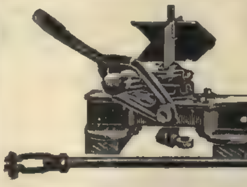
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Suite 1710 Park Row Bldg., New York
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# More Servic

*Sept. 2*

# Electric Ra

**Will help you to sell more equipment if you have the right kind of equipment to sell**

What have you done, what are you going to do to help your electric railway customers give "More Service at Less Cost"?

You know the situation—able-bodied labor high and scarce, every kind of railway supplies skyrocketed in price and retarded in delivery; the heavy taxes of peace increased to the back-breaking point by the demands of war.

**And all these extra burdens in the face of declining revenues!**

***We stand ready to H***

ELECTRIC RAILWAY JOURN

Member of Audit

# at Less Cost

## ssue

# vay Journal

## Manufacturers, it's up to you to prove at once how electric railways can give More Service at Less Cost

Each one of you surely has something that will enable electric railways to operate more safely, more efficiently and more satisfactorily.

Have you really done **everything** possible to prove this fact, or are you waiting for the railways to come to you?

Can't we bring you and the railways together in the market place at a time when they will be in the mood to listen eagerly to your story?

That market place is the "More Service at Less Cost" issue of the Electric Railway Journal. That time is September 22!

The more inspiring and the more convincing your message, and the message of your fellow-manufacturers in this issue, the greater the likelihood that the electric railway industry in its entirety will be ripe to consider every device that can lower its expenses and raise its earnings.

Let the nature of your message suit the nature of this issue and let the length of that message be in proportion to its importance.

***rite—Wire—Telephone***

**39 WEST 39th STREET, N. Y. CITY**

rculations

# BUSY BIRMINGHAM BUYS Bound Brook Bushings *for its* TROLLEY WHEELS

The Iron City of the Southland is busy today as never before in its history.

Every possible mile has to come out of the rolling stock, both in motor and trailer service.

In attaining this end, the Birmingham Railway, Light & Power Company takes proper precautions right at the current collection point by using

**Bound Brook Bushings Exclusively**

All genuine "Oil-less" bearings have always been made at Bound Brook, N. J., in the United States of America, by the

**Bound Brook Oil-less Bearing Co.**

*Formerly Graphite Lubricating Co.*

Teach the Motorman
the Value of Power

Investigate the Merits of

ECONOMY
SANGAMO
BUILT LIKE A WATCH
METERS

Ask for Bulletins

Sangamo Electric Company
Springfield, Illinois

Specialists in Meters for Every Electrical Need

# The Bonham Traffic Recorder

## Differentiates Your Passengers

Your auditing department is interested not only in the AMOUNT of money and tickets collected, but also in the ACCURATE RECORDING of the fares collected.

Your transportation department is not only interested in the TOTAL number of passengers, but also in their individual originating and destination points.

### The Bonham Traffic Recorder Is Both an Auditing and a Traffic Check

Because it gives you the "on and off" fare and mileage record of every individual passenger, whether that passenger paid cash, ticket, half-fare, pass or an arbitrary fare fixed by local franchise conditions or foreign trackage agreements.

A traffic count, taken at random at any station on your line, will soon prove to you what wonderful control of your earnings is permitted with the Bonham Traffic Recorder, and

ONLY THE BONHAM TRAFFIC RECORDER

**The Bonham Recorder Co.**

**Hamilton, Ohio**

```
Month Day Train Div    Total Cash   Total Pass
02    08  12    2      10958        11988
On          Off           Miles      Cash

30          37             3.5          7
37          91            27
37          91            27
37          91            27
37          91            27
37          91            27
37          46             4.5          9
37          57            10
37          57            10
37          57            10
37          57            10
37          57            10
57          68             5.5         11
57          91            17           34
57          91            17           34
68          91            11.5
68          91            11.5         23
68          91            11.5         23
78          91             6.5         13
88          91             1.5          5


02 08 12 2      10967   12008
```

H S Lake

# *Human Engineering*

"Problems in human engineering will receive during the coming years the same genius and attention which the nineteenth century gave to the more material forms of engineering."

—THOS. A. EDISON.

Mr. Edison's words are true. Successful electric railway men agree with him and we agree with him. We have solved one very important problem in human engineering, and the solution of that problem is the Ohmer System. The Ohmer System protects the income of electric railways. It reduces fare collecting to a scientific basis. The Ohmer System is not a machine. A machine, the Ohmer Fare Register, is only a part of it. The register does all that any machine can do or should do. It produces complete, accurate and untamperable records of every transaction between passengers and conductor. It indicates the character of each transaction clearly and publicly. The Ohmer System allows human nature to work only in one direction, toward carefulness, honesty and efficiency. It prevents human nature from failing through temptation. It does this by making the conductor discover for himself that his best interests are served only when he serves his employer best. The Ohmer System is our triumph of human engineering.

## Ohmer Fare Register Company
Dayton, Ohio

# Collier Car Cards

## Often Cost Hundreds of Dollars Each

Like any other form of advertising, car cards pull business in proportion to their attractiveness and variety. A car card must consist of something more than white paper and black ink.

Collier Service includes a large number of artists, engravers and writers whose sole duty is to devise telling pictures and text in every color and style.

No local agency could afford to give such value to the advertiser. Collier Service can and does give such value only because and so long as the overhead expense can be divided among thousands of cars.

Barron G. Collier
INCORPORATED

**Candler Building**
**220 West 42nd Street, New York City**

There is no use hauling a lot of superfluous weight in the shape of headlining.

Agasote Headlining is light in weight.

It has very high temperature insulation efficiency.

It takes and holds paints as well or better than wood or steel.

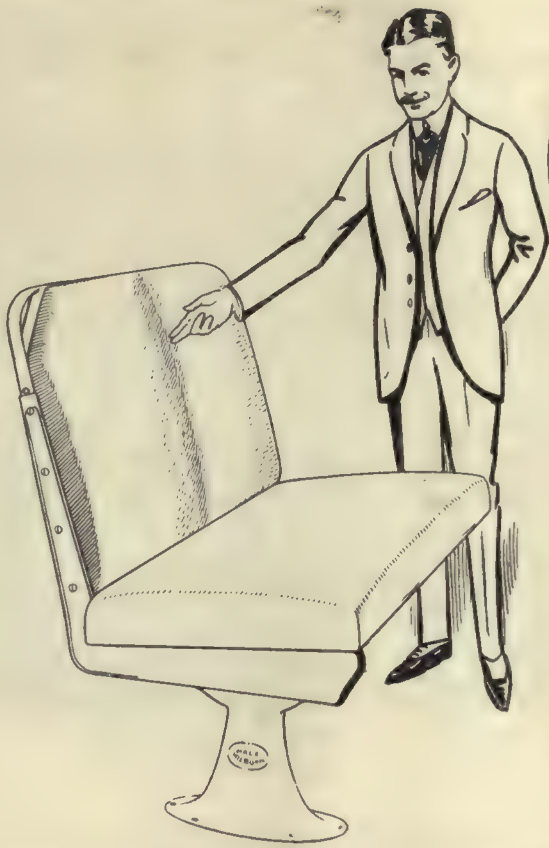
It is extremely economical to install.

Being a homogeneous fibrous material without grain it absolutely cannot split, crack or check.

It is the ideal headlining material.

**The Pantasote Company**

**11 Broadway, New York** **797 Monadnock Bldg., San Francisco, Cal.** **People's Gas Bldg., Chicago, Ill.**



## The Central Flare in the Shaped Back of the Hale and Kilburn No. 108 divides the Seat Fairly and Gives Comfort, too

"First come, first served" is a practice which can be abused.

Especially when the passenger next the window flows over beyond his fair half of a transverse seat.

That's one reason why some Hale and Kilburn seats with springless backs, like the No. 108, are made with a flare or division, which is at maximum height in the middle of the back.

This shaping is not improperly conspicuous, but it's just enough to assure an equal and comfortable division of the seat.

This shaped back is also a feature of the Hale and Kilburn "Walkover" seats on the famous stepless cars of the New York Railways Company, running on Broadway, New York.

*Pioneers in Steel Trim for Passenger Cars, including interior finish, steel doors, etc.*

HK WALKOVER COPYRIGHTED

**Hale and Kilburn Co.**

Philadelphia New York Chicago
Washington Atlanta San Francisco

HK WALKOVER COPYRIGHTED

# KIDDIES vs. CARS

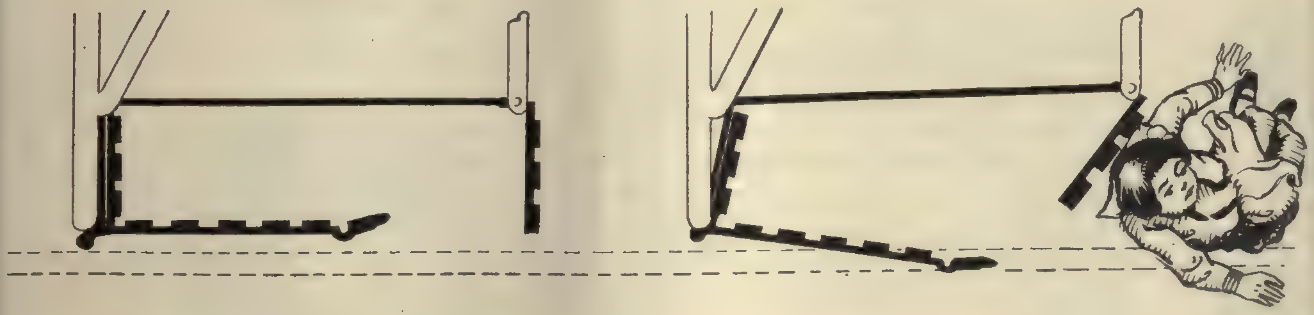
So long as there are kiddies in the streets there are going to be street car accidents.

But it is safe to say that the part played by H-B Guards and Providence Fenders in maintaining the good will of your public is not the least important of the services rendered by these protectors of life and limb.

A slight bruise or two and a wholesome fright teaches the child a lesson he will not forget, and breeds no ill-will against the company.

Since their advent H-B Guards and Providence Fenders have knocked the bottom out of street accident claims.

Let us send you blue print and details on the **mechanical side** of the question.



**The Consolidated Car Fender Co.**
Providence, R. I.

General Sales Agent
**Wendell & MacDuffie Co.**
61 Broadway, N. Y.

# Columbia Brake Levers

## No. 6—

## Reaming and Bushing

The last steps in the making of a Columbia brake lever are reaming and bushing.

Reaming assures a clean, smooth hole and the exact diameter.

The bushings inserted in the reamed holes will stay firm and wear long—

### Like all of these Columbians:

TOOLS

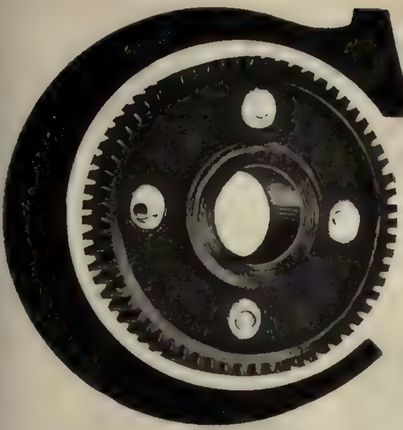
- Armature and Axle Straighteners
- Armature shaft straighteners
- Armature buggies and stands
- Babbitting molds
- Banding and heading machines
- Car hoists
- Car Replacers
- Coil taping machines for armature leads
- Coil winding machines
- Pinion pullers
- Pit jacks
- Signal or target switches
- Tension stands

CAR EQUIPMENT

- Armature and Axle Bearings
- Armature and field coils
- Bearings (Axle and Armature)
- Brush-holders and brush-holder springs
- Brake, door and other Handles
- Brake forgings, riggings, etc.
- Car trimmings
- Commutators
- Controller handles
- Forgings of all kinds
- Gear cases (steel or mall. iron)
- Grid resistors
- Third-rail shoe beams and accessories
- Trolley poles (steel) and wheels

**Columbia Machine Works & Malleable Iron Co.**
Atlantic Ave. and Chestnut St., Brooklyn, N. Y.

W. R. Kerschner Co., Inc., N. Y. Holden & White, Inc., Chicago F. F. Bodler, San Francisco



# Catskill

## Gears and Pinions

# *They're "Armorized"*

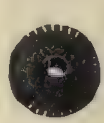
—made from the finest of steel, cut absolutely true to pitch, and then subjected to a special treatment remarkably successful in its ability to render these gears extraordinarily tough and durable—a fact strikingly demonstrated by the record of CATSKILL Gears and Pinions in hard service.

In fact, this "armorizing" process—

***—imparts a wearing ability from three to five times greater than that of ordinary gears and pinions.***

For heavy service these especially prepared CATSKILL Gears and Pinions will be found to effect a gratifying economy.

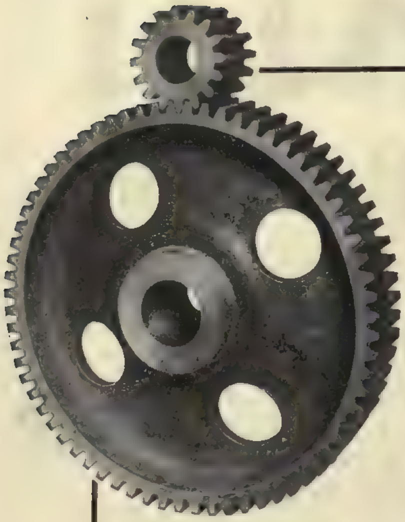
*Data sent on request*



**W. R. Kerschner Co., Inc.**
50 Church Street, New York

# *Nuttall Railway Products*

## *Reduce Maintenance Costs*



## B P Forged Steel Gears

Because of its superior wearing qualities, B P Forged Steel Gearing is particularly adaptable to Electric Railway applications.

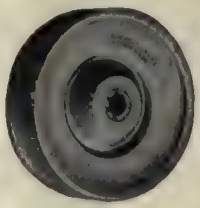
The increased physical properties give it a life of 4 times that of untreated steel gearing in identical service and the great saving that this permits in wear, time, and ultimate cost covers many times the slight additional first cost.

## Nuttall Trolley Wheels

Are all that service demands. Containing sufficient material to stand long wear, yet not heavy enough to injure the springs and cause sluggish trolley action. Hard enough to insure long life without undue wear on the wire.

The wheels are equipped with graphite bushings and wheels intended for high speed service are self-lubricating.

All machining is accurate and designed to give long life with minimum wear on the wire and the wheel.



## Trolley Bases

The Nuttall Ball and Roller Bearing types of trolley bases are designed to meet every service condition at a minimum cost. They demand less attention and repair than ordinary trolley bases; are readily responsive to variations in the height of the wire and are sensitive to curves.

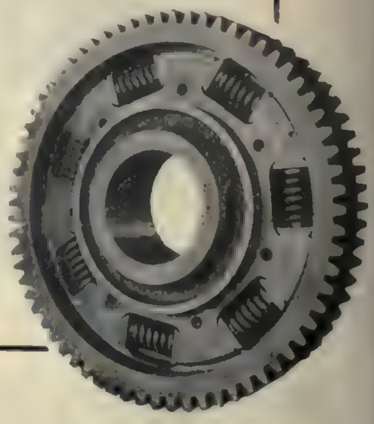
We handle a full line of repair parts at all times, which accounts for some of our old-timers being in service for 25 years.

## Flexible Gears

Nuttall Flexible gears are designed for service where shocks, due to rough track, brake and power applications or motor characteristics, will injure a solid gear.

They protect your bearings, trucks, brushes, armature windings, etc., from injurious shocks and jars.

All internal wearing parts are case hardened and ground and need no renewals, while the rim can be replaced when worn.



NUTTALL
PITTSBURGH

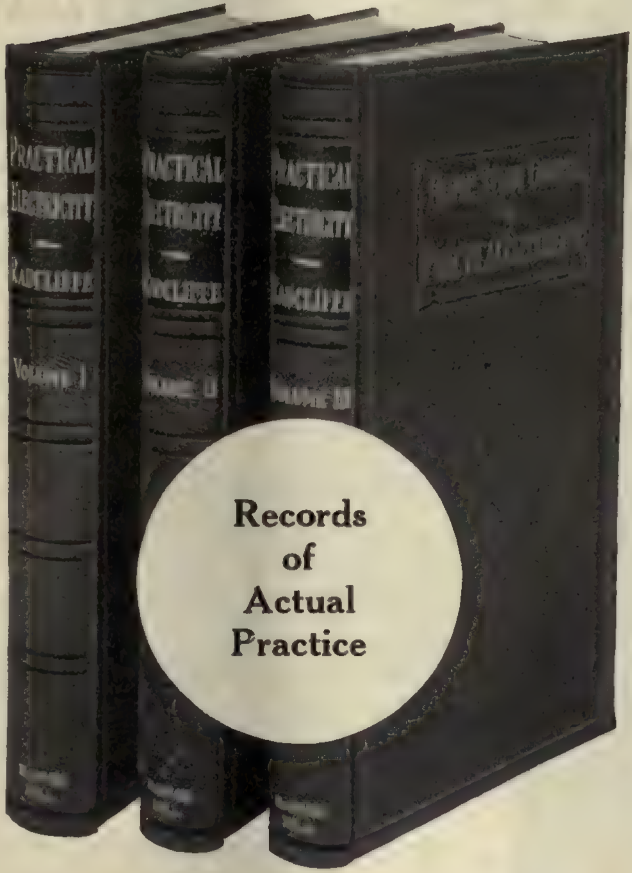
# Home Study Course in Practical Electricity—

Railway employers know the increased earning power of the electrically trained man.

No Money Down.

**$1** Per Month

for only 6 months.



An Innovation in Electrical Instruction—

700 pages of

## Actual Practice

Study Electrical Practice Under an Expert.

Complete Home Study Course for $6.

Every successful electrical railway man knows how helpful a *working* knowledge of electricity is.

Probably nothing is of more importance than a thorough grounding in the subject, but it is a foregone conclusion that you do not need to cover electricity in its entirety. The working principles are what you want to know.

It is just this phase of electrical practice which is covered fully in the Home Study Course in Practical Electricity, by Mr. W. H. Radcliffe, former electrical expert with the General Electric Company of Schenectady, N. Y. He has presented that part of electricity which every electric railway man should know, and know well.

The course contains 700 pages of questions and answers which constitute a complete knowledge of electrical engineering. It begins with PRACTICE and ends with RECORDS of ACTUAL WORK as it is done today.

This is a chance to obtain a complete working knowledge of electricity for $6. Better still, you have the advantage of convenient monthly payments of $1 per month for 6 months. Could anything be easier?

We are so sure of its value to readers of the Electric Railway Journal that we will send complete course for 10 days' free examination on receipt of the coupon below. You will be under no obligation to buy unless the course appeals to you. We pay the charges both ways if you do not find the books exactly suited to your needs.

Why not mail the coupon today—now if possible?

**McGRAW-HILL BOOK CO. INC.**
239 WEST 39TH STREET, NEW YORK
London: 6 & 8 Bouverie St. E. C.

**FREE EXAMINATION COUPON**

**McGRAW-HILL BOOK COMPANY, Inc.,**
**239 W. 39th St., New York.**

Gentlemen:—Send to me, charges paid, the Home Study Course in Practical Electricity, three volumes, price $6. I agree to examine the books, and if satisfactory will remit $1 in ten days, and the balance at the rate of $1 per month. If books are not wanted I will write you for shipping directions.

Signature ..............................
Your Address..............................
City and State..............................
Name of Employer..............................
His Address..............................
Your Position..............................

(E-8-4-'17)

**Standard for 67 Years**

The Chilled Iron Wheel has performed its every function at a minimum cost.

***For Freight Cars***

95% of all cars in this type of service are carried on Chilled Iron Wheels.

***For Street Cars***

The Chilled Iron Wheel is Standard for Street Car Service in 95 out of 100 cities in the United States and Canada, operating 100 cars or over.

***The Conclusion***

to be gained from these figures is that the Chilled Iron Wheel gives the Greatest Service for the Lowest Cost.

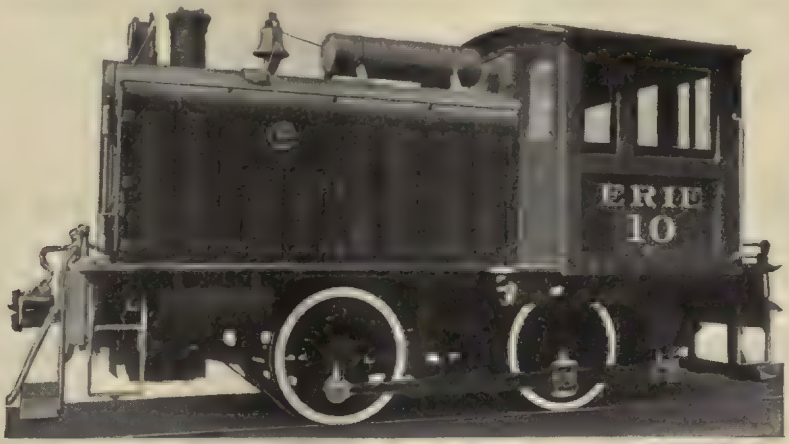
**Association of Manufacturers of Chilled Car Wheels**
**1228 McCormick Building, Chicago, Ill.**

Representing Forty-eight Wheel Foundries Throughout the United States and Canada. Capacity 20,000 Chilled Iron Wheels Per Day.

The Wonderful Single-Service Chilled-Iron Wheel

# Baldwin Gasoline Locomotives

are specially fitted for light switching service about electric railway shops, power-houses and terminals. They are independent of any external source of power, hence can be run in localities where it is inconvenient to install a third rail or an overhead wire. They throw no sparks, and with reasonable care the fire-risk attending their use is practically negligible. The mechanism is simple; there is no boiler requiring attention, and one man can easily handle the locomotive. Fuel is consumed only when power is actually being developed; an important source of economy.



**Baldwin Standard Gauge Gasoline Locomotive**

**Cylinders (6)—7¾ x 12 inches**
**Wheels, diam.—42 inches**
**Wheel-base—6 ft. 6 inches**
**Height—11 ft. 0 inches**
**Width—9 ft. 0 inches**
**Length—18 ft. 8 inches**
**Weight—45,000 lbs.**

The illustration shows a standard gauge Baldwin gasoline locomotive, which is used for switching service in a freight yard. The engine has proved reliable in operation, and maintenance costs have been low; and although the greater part of the work is done on curves, the flange wear is remarkably light. The locomotive is built with moderate over-all dimensions, and a machine of this general type could be used on practically any standard gauge electric railway.

Baldwin Record No. 85 further describes the construction and advantages of these locomotives.

## THE BALDWIN LOCOMOTIVE WORKS

Philadelphia, Pa.

REPRESENTED BY

**F. W. Weston,** 120 Broadway, New York, N. Y.
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**Williams, Dimond & Co.,** 310 Sansome St., San Francisco, Cal.

RELIABILITY - PERMANENCE - ECONOMY.

OKONITE

TRADE MARK
REG. U. S. PATENT OFFICE.

# The STANDARD for RUBBER INSULATION

**Railway Feed Wires** insulated with OKONITE are unequaled for flexibility, durability, and efficiency, and are in use by the leading Electric Street Railway Companies. OKONITE is preferred above any other insulation for Car Wiring, Telegraph and Telephone Purposes.

OKONITE WIRES—OKONITE TAPE
MANSON TAPE—CANDEE WEATHERPROOF WIRES
CANDEE PATENTED POTHEADS

***Samples and Estimates on Application***

**THE OKONITE COMPANY, 501 Fifth Ave., cor. 42nd St., New York**

**CENTRAL ELECTRIC CO., Chicago, Ill., General Western Agents**

**F. D. Lawrence Electric Co., Cincinnati, O. Novelty Electric Co., Philadelphia, Pa. Pettingell-Andrews Co., Boston, Mass.**

# *Just Look at This Hanger—*

*Immediate Delivery from parts in stock*

You can see what its three simple parts offer in the way of time and labor-savers in installation and alignment on the wire.

## White's Porcelain Trolley Hanger

consists of the malleable iron yoke—sherardized so that it never rusts out—

The heavy glazed porcelain insulator that doesn't "break down" or crack and

The "Stud"—a standard bolt sherardized or furnished in bronze.

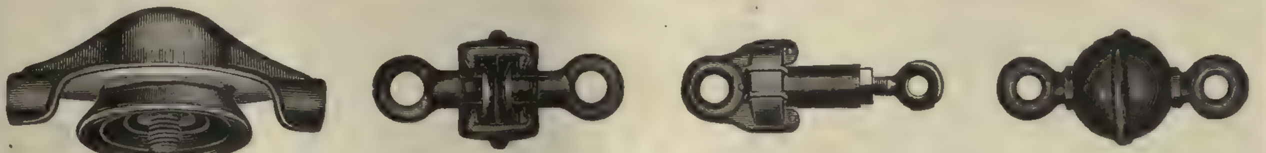
We can confidently recommend White's Porcelain Trolley Hangers to you, and tell you that it is safe, durable and quick to install.

A sample, which we would be pleased to send you, will convince you that it is an efficient hanger from every standpoint.

*Write for the sample and quotations on complete hangers or parts—today.*

**T. C. WHITE**
**Electrical Supply Co.**
**1122 Pine St., St. Louis, Mo.**

**Foreign Representatives, Forest City Electrical Service Supply Company, Salford, England**



You Can Minimize Overhead Repair Work

and successfully cut maintenance costs if you turn to

The Macallen Line

of strain insulators, hangers, splicing ears, crossings, and other overhead material.

They are "specialty" products, designed and built to make "Macallen" the standard on American railways.

It will pay you to write for information and prices.

The Macallen Insulating Joint

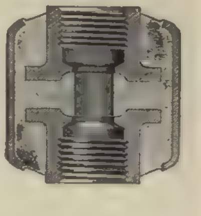
Adopted by principal air brake manufacturers as part of their standard equipment. Also insulates steam pipes, etc. Shell is seamless drawn steel, nipples are machined from steel rod, and insulating material is Macallen Vulcanite Compound, not affected by heat or oil—practically indestructible.

May We Send Our Catalog?

TRADE MACALLEN MARK

The Macallen Company
Macallen and Foundry Sts., Boston

TRADE MACALLEN MARK



Standardize on DREW Clinch Ears
for the greatest service efficiency

The routine production of Drew Clinch Ears includes correct patterns, new metals, expert foundrymen, analyzed castings and accurate machining.

Usage soon proves out the resulting niceties in design, the honesty of materials and workmanship. Wise Line Superintendents and careful Purchasing Agents specify Drew Clinch Ears because they "cost least per car mile."

Being line material specialists exclusively, in all probability we have in stock overhead material that would simplify the work or reduce costs on your property.

*It will pay you to investigate, and have Drew Quotations on your overhead requirements.*

DREW ELECTRIC & MFG. CO.

Offices and Works: Indianapolis, Ind.

Representatives in principal cities.

*Drew Overhead Line Material Is Standard on Keenly Managed Roads*
*Get Quotations*

**Steel Cross Ties**

are the recognized standard for permanent track construction by many representative street railways.

A trial will demonstrate their economy.

**Carnegie Steel Company**

General Offices: Pittsburgh, Pa.

3-T

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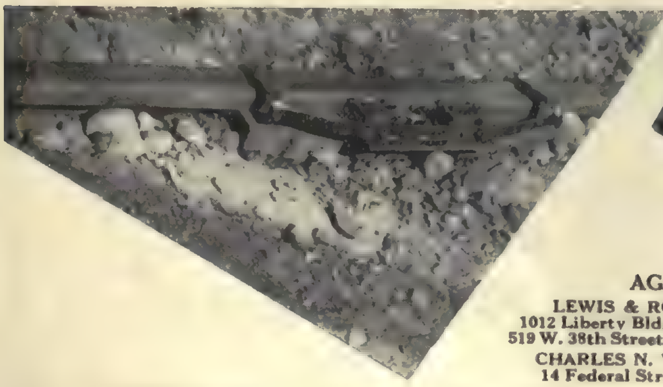
THEY can't speak too highly of LINCOLN ARC-WELDING on the Worcester-Springfield Line, where a short time ago on pick up work they were making 100 finished LINCOLN bonds each 9-hour day.

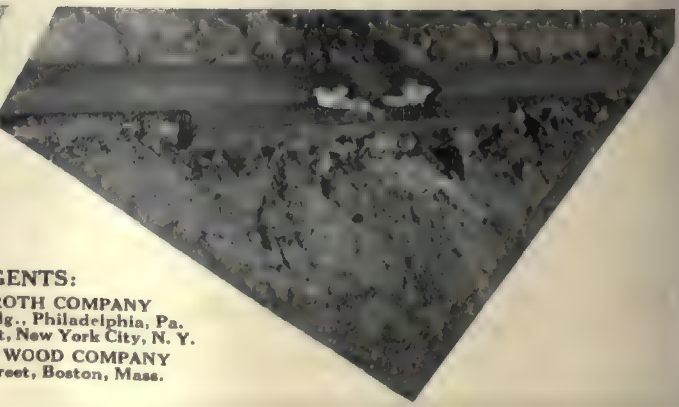
It's the rapidity and certainty of operation that counts, with LINCOLN Bonds! Three minutes does the whole trick, a perfect mingling of steel and copper that makes the line continuous!

**THE LINCOLN BONDING CO.**

**636 Huron Rd., CLEVELAND, OHIO**

**The whole bond was completed in 3 mins.: from start to finish**





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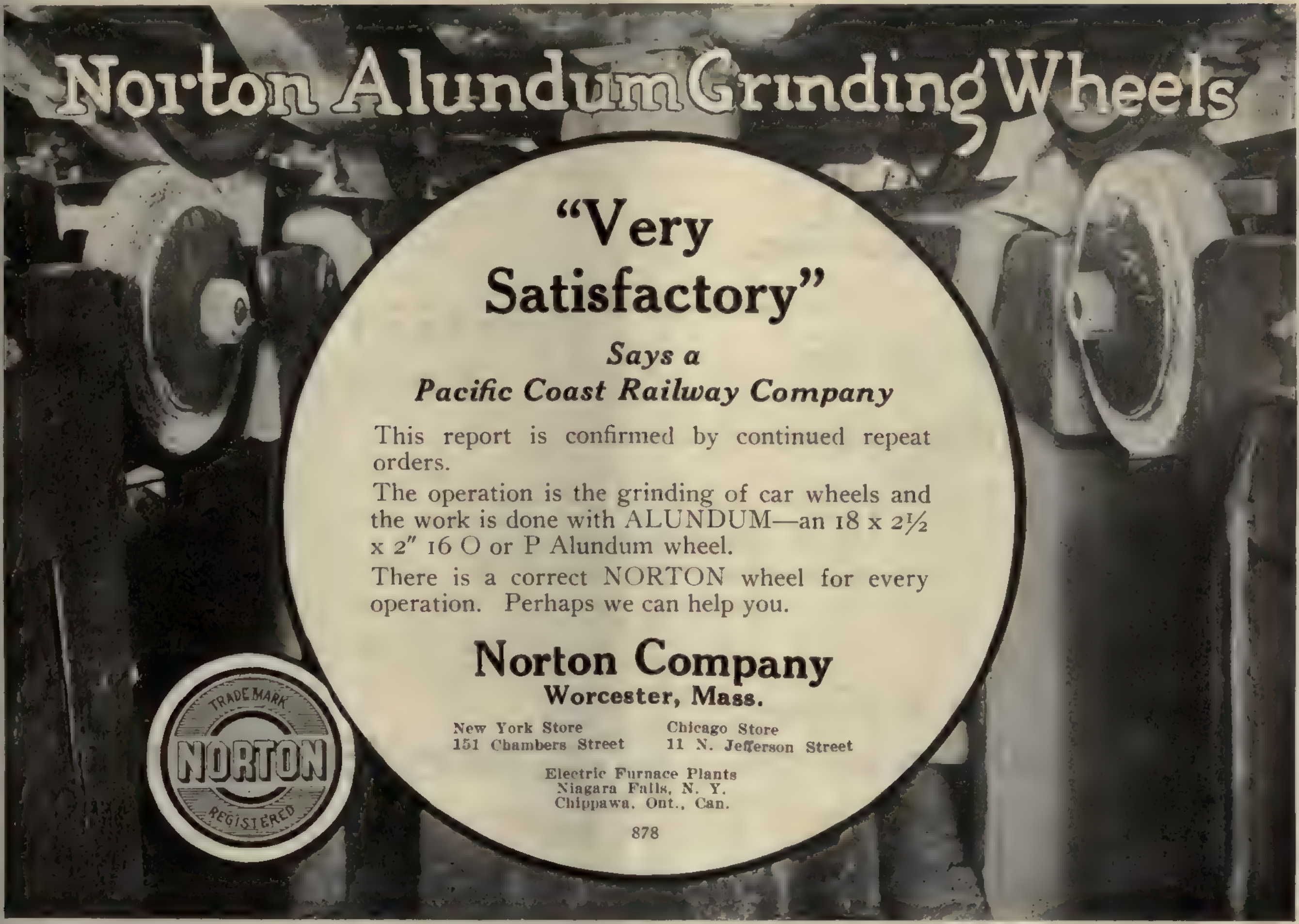
14 Federal Street, Boston, Mass.



# Norton Alundum Grinding Wheels

## "Very Satisfactory"

*Says a*
*Pacific Coast Railway Company*

This report is confirmed by continued repeat orders.

The operation is the grinding of car wheels and the work is done with ALUNDUM—an 18 x 2½ x 2" 16 O or P Alundum wheel.

There is a correct NORTON wheel for every operation. Perhaps we can help you.

**Norton Company**
**Worcester, Mass.**

New York Store
151 Chambers Street

Chicago Store
11 N. Jefferson Street

Electric Furnace Plants
Niagara Falls, N. Y.
Chippawa, Ont., Can.

878

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# THE FORD TRIBLOC

## The Chain Hoist of Inner Perfection and Outer Protection

Planetary Spur Gearing

THERE is one thing that makes the Ford Tribloc Chain Hoist stand out from others in looks and performance. It is the patented **LOOP** Hand Chain **GUIDE** that prevents "gagging" of the hand chain and allows rapid travel at practically any angle of operation. Look for this loop guide, the outward sign of speed and protection.

Inner perfection is attained by using planetary spur gearing made of steel with a factor of safety of 3½ to 1. The Ford gearing converts 80% of the power applied to the hand chain into hoisting energy and lifts a ton on a mere 82 lb. pull on the hand chain.

Loop Hand Chain Guide

**Other merits of Ford Tribloc design and manufacture and the liberal 5-year guarantee are explained in our new Catalog. May we send you a copy?**

Ford of Philadelphia

**FORD CHAIN BLOCK & MANUFACTURING CO.**
**142 OXFORD STREET, PHILADELPHIA, PENNA.**

2092D

TRADE MARK

**Oxweld**

## *When IS Junk Really Junk?*

That's a stiff question to answer since street railways everywhere have provided themselves with Oxweld Welding and Cutting Equipment. Most shop managers would say:

## "Not While We Have OXWELD Equipment"

It's a fact that the scrap pile has bought and paid for many an Oxweld outfit and then gone on saving money and delays for years to come. And it will do the same thing in *your* shop.

Oxwelding and Cutting are worth any street railway man's careful study. Bulletin Series 700-R tells all about it, with photos and costs. Get the booklets today; they're great reading for men who are out after economy records.

**Oxweld Acetylene Co.**

**NEWARK, N. J. CHICAGO LOS ANGELES**

**Largest Makers of Oxy-Acetylene Welding and Cutting Equipment in the World**

SAFETY FIRST
ECONOMY renewable cartridge FUSES

## Protect Cars and Power-plant

Don't trust to your more limited facilities for refilling fuses. As fuse specialists, we furnish reliable and carefully ***tested Renewal Links*** all ready to insert in

**ECONOMY renewable cartridge FUSES**

when they blow. These Links cost but a trifle and assure a complete break in the circuit at the required overload.

There's no need to use an extra new fuse every time one blows when the ***efficient and safe*** Economy fuse can be renewed over and over again with our ***tested*** Renewal Links at a saving of 80% of fuse maintenance expense under old-style, wasteful methods

***Write now for Bulletin No. 17 and our catalog.***

**Economy Fuse & Mfg. Co.**

**Kinzie and Orleans St.**
**Chicago, Ill.**

# HYDRAULIC JACKS

## For the Car Shop

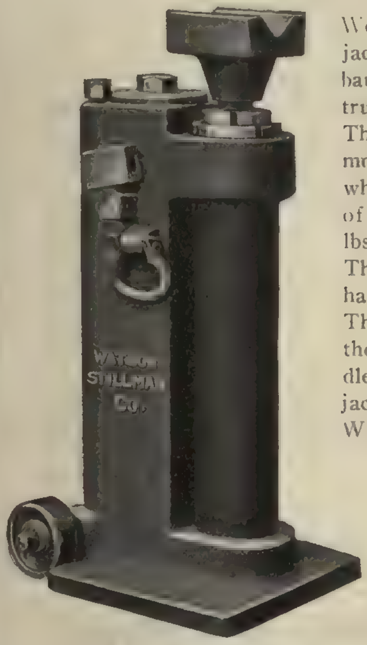
We show here two styles of our telescopic jacks for use exclusively in street car barns for removing motors from car trucks.

This motor lift has broad rollers for easy movement about the floor; the height when down is only 32 inches, with a lift of 37 inches, and a lifting capacity of 3000 lbs.

The demand for a low jack with long lift has led to the manufacture of this tool. The small wheels mounted on the base of the reservoir permits the jack to be handled easily when tilted at an angle. These jacks are built in capacities of 10 and 15 tons with lifts of 33 inches.

Write for catalogs of jacks, pumps, benders, shears, bending presses, punches, etc.

3000 lbs. capacity



15 tons capacity

**The Watson-Stillman Co.**

Engineers and Builders of Hydraulic Machinery

W-S HYDRAULIC 46 Church St., New York W-S HYDRAULIC

Chicago—McCormick Building

374

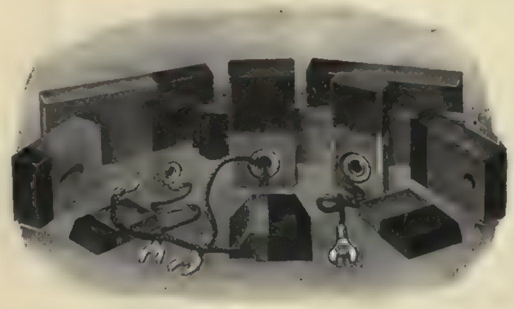
GOOD TAPES FOR ALL TRADES AND PURPOSES
The Mechanical Rubber Co. CLEVELAND · OHIO

*Make your next move toward better*

**TAPES**

The Mechanical Rubber Co.
Cleveland, Ohio

*Your commutators reflect the performance of your brushes*



*If you use*

**DIXON'S**

**Graphite Brushes**

their perfect service will be reflected in the polished smooth surface they will produce on the commutators of your generators and rotaries.

Dixon brushes are non-scratching—they're self-lubricating; it's impossible for them to score commutators.

And they're eminently suitable for railway station service because graphite brushes adapt themselves peculiarly well to high voltage work.

Let us send you prices on your particular type.

*Address Department 108-M.*

Made in JERSEY CITY, N. J., by the

**Joseph Dixon Crucible Company**

Established 1827

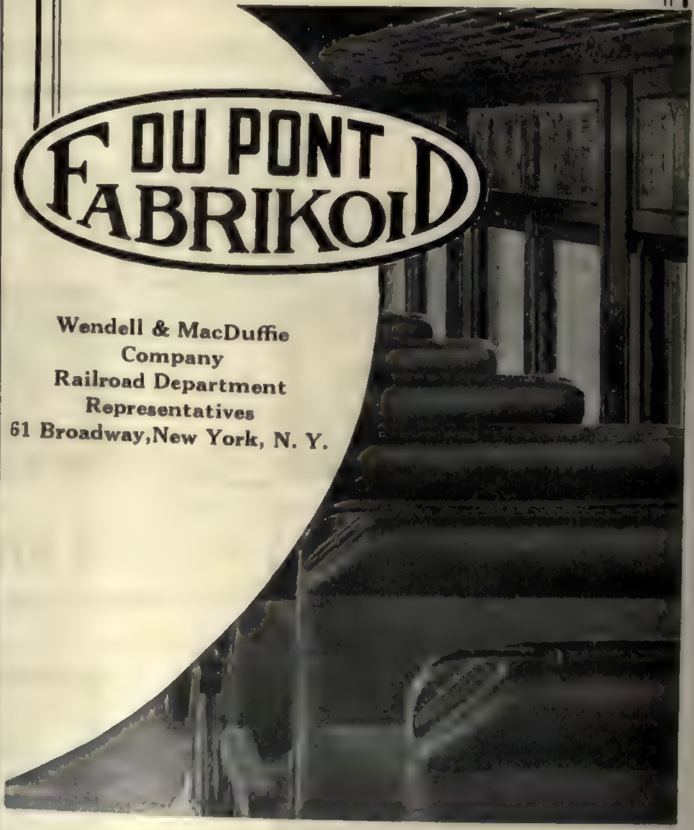
Your passengers will appreciate the comfort and cleanliness of Fabrikoid. You will appreciate its economy.

Fabrikoid costs less and wears better than leather. It has all the advantages of leather plus being waterproof, grease proof, stain proof and washable. It is permanently beautiful and sanitary.

Fabrikoid is absolutely uniform in width, thickness and strength. It cuts with minimum waste, is easily applied and perfectly dependable in service. Insects or vermin will not attack it. It is guaranteed not to crack or peel.

Samples of Fabrikoid on request. They will interest you. A trial order always makes a customer. Write us.

**Dupont Fabrikoid Co.**
Dupont Building
Wilmington, Delaware



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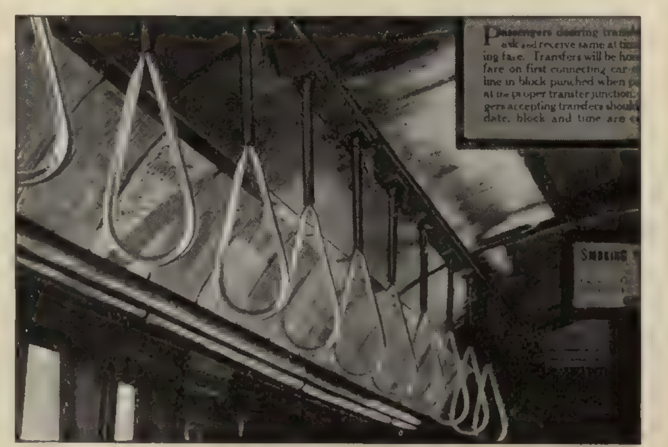
Wendell & MacDuffie
Company
Railroad Department
Representatives
61 Broadway, New York, N. Y.

**An Ideal Material for Seating Your Cars**

**Light Pressed Steel**

**HAND STRAPS**

(All Metal)



1. Light, neat, flexible, made of thin metal ribbon porcelained and steel links.
2. Comfort making, public pleasing, handhold. It has been noticed that the public readily takes thereto, due to the liberal width grip, which increases the
3. Revenue and load capacity of cars about 5 per cent by accommodating the hands of two passengers.
4. Safe and permanent for years, like a door handle, no breaking, not inflammable.
5. Earning power. It saves its own cost more than once over perishable leather which shrinks 10 per cent, hardens, cracks and tears from absorbing atmospheric dampness, drying out and dangling or swinging before it really wears.
6. Due to the shortage of car shop labor and rate of wages, most roads have found the use of temporary car parts expensive.
7. Guaranteed, while leather in general has invisible bad spots.
8. Detachable, readily, by drawing a pin; no rivets, no screws.
9. Endorsement, thousands in use on all lines in Western New York. Specially the heavy traffic lines.
10. Produced of metal ribbon on high speed machines like nails. Specify them for your old cars.
11. Poise, no swinging, no noise, no dangling; meets a long felt want as it has been expressed as being a relief by the riding public; also makes the straps available when most needed.
12. Samples are mailed gratis for trial on your cars. Kindly write us.

**CENTRAL EQUIPMENT COMPANY—BUFFALO**

**Chosen for Safety and Efficiency by the Brooklyn Rapid Transit**

Everything for the safety, convenience and comfort of passengers receives careful consideration in the selection of equipment for this great railway—and it chose "Edwards" as the "safety and efficiency" sash fixture for hundreds of its big cars.

There's a world of merit in Edwards Sash Fixtures. Specify them for *your* cars today.

Our Catalog gives the details. Ask for a copy.

**The O. M. Edwards Co., Inc. Syracuse, N. Y.**

Window Fixtures
Top, Bottom and Side Weather Stripping
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Metal Extension Platform Trap Doors
All-Metal Sash Balances
Railway Devices

# For High Speed Operation

## —Large Diameter Kalamazoo Trolley Wheels

As a solution to arcing and short wheel life on high speed electric railway work, two new Kalamazoo Wheels have been designed.

They are (No. 20) 11½ inches and (No. 21) 10 inches in diameter. An ample increase of width, depth of groove and length of hub insures a well-balanced wheel in each case.

Tests covering considerable mileage at high speeds show that these two new "Kalamazoos" greatly decrease sparking, while offering longer wheel life. There is more bearing on the wire, with consequent greater contact and current carrying capacity.

The patented Kalamazoo Harps have been enlarged to carry these wheels.

Try several on your lines. Compare their service with that of smaller wheels.

*Write Today.*

**STAR BRASS WORKS**
**KALAMAZOO, MICHIGAN**

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**10**
**Seconds**

10 seconds to change the complete Bayonet Trolley Harp and wheel by hand!

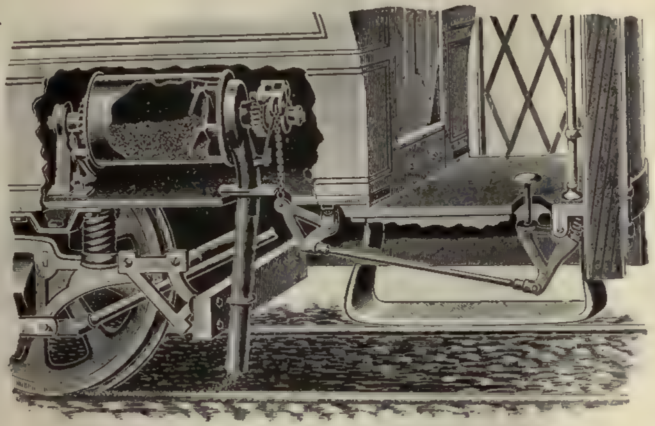
And there is more in this 10 seconds than meets the eye. With so easily handled a Harp as the "Bayonet" repairs are made at the bench instead of on the pole.

10 seconds' close inspection enables an engineer to realize the immense superiority of "Bayonet" Trolley Equipment.

10 seconds' reading will inform you that "Bayonet" Trolley Equipment has been in use for years on some of the largest high-speed railways in the country to their great satisfaction.

Spend 10 seconds in writing for particulars and price to the—

**Bayonet Trolley Harp Co.**
**Springfield, Ohio**



The Tracks Will Soon Be Slippery

First, wet leaves will tend to make them so, then snow and sleet. It is good economy to add the

Sprague Rotary Sander

to your rolling stock now.

The rotary principle insures free sand at every press of the plunger—with the impossibility of the supply pipe becoming clogged.

You can see by the illustration how leakage is impossible and how the buckets will pick up sand as long as there is any left in the drum.

It's absolutely dependable—the principle upon which it is based proves that to be a fact.

Write us for bulletin No. 27, which describes it in detail.

*Get a copy now.*

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BOYERIZED Pins and Bushings

Are Capital Things at Washington

Both the Capital Traction Company and the Washington Railway & Electric Company are big users of Boyerized pins and bushings to make their brake rigging low in maintenance and high in safety.

There's a place for Boyerized equipment wherever you have to fight expensive wear and possible accidents. This is but a partial list of our products.

**Bemis Trucks**
**Case Hardened Brake Pins.**
**Case Hardened Bushings**
**Case Hardened Nuts and Bolts**
**Lord Baltimore Trucks**
**Manganese Brake Heads**
**Manganese Transom Plates**
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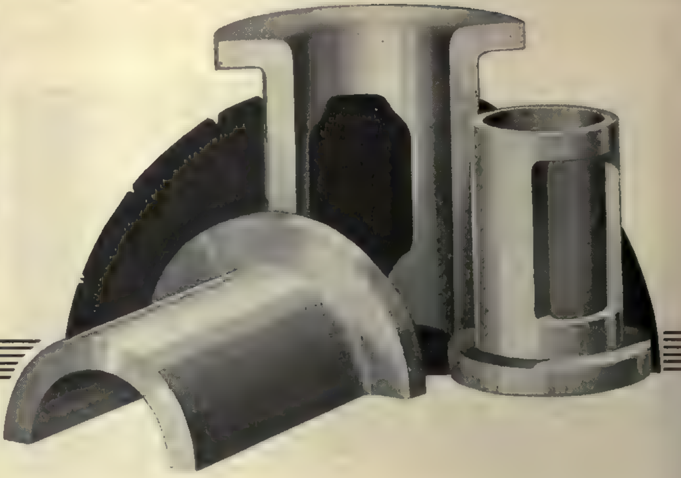
**Bronze Axle Bearings**

Bemis Car Truck Co., Springfield, Mass.

MORE-JONES
"TIGER" BRONZE
AXLE AND ARMATURE
BEARINGS



## Over-Time Bearings

The over-time that carries on beyond the average mileage you've been getting. The extra service that's given without extra cost. The plus performance.

It's found in More-Jones "Tiger" Bronze Axle and Armature Bearings.

"Tiger" Bronze has been specially developed for bearing service. It is unequalled in anti-frictional qualities, toughness and density of grain. Perfectly uniform throughout. Very strong, wears very slowly and evenly, as nearly frictionless as any bronze metal can possibly be.

A single trial order will prove the value of More-Jones "Tiger" Bronze over-time service in lowering cost per mile and reducing operating troubles.

*Further information and prices on application.*

**More-Jones Brass & Metal Co., St. Louis, U. S. A.**

Le Carbone Carbon Brushes

are

Uniform

They talk for themselves

Pittsburg Office
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**W. J. Jeandron**
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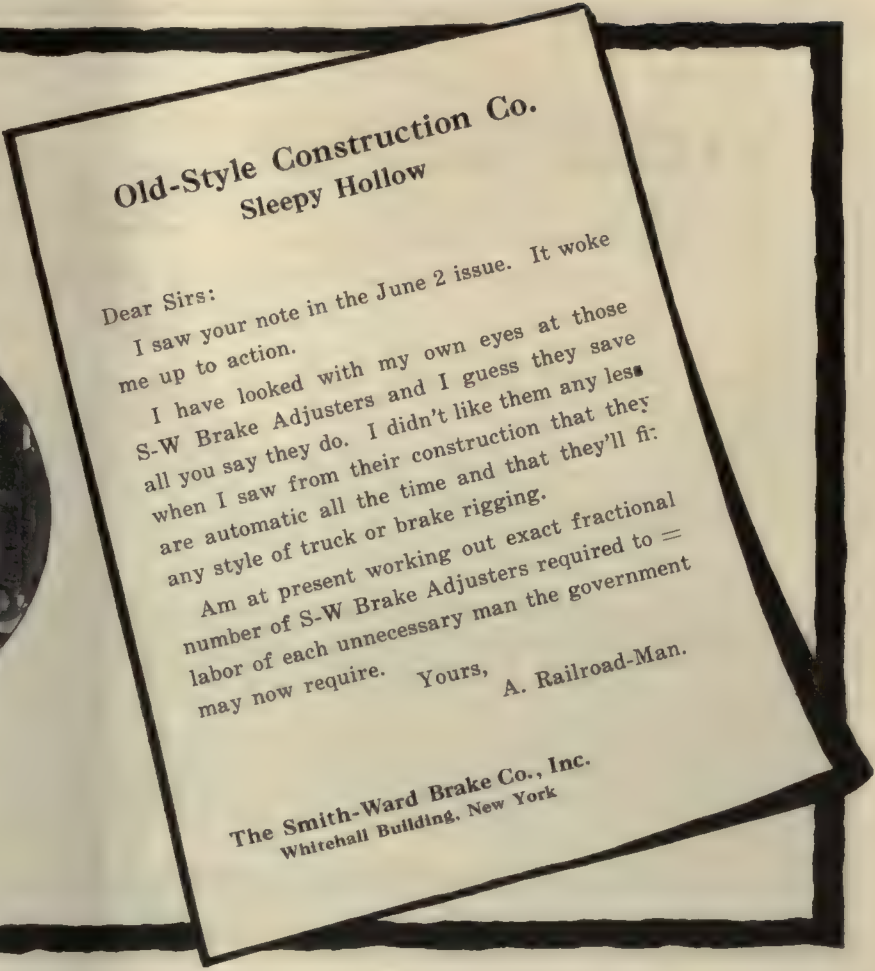
## Remember

that S-W. shim adjusters take up the slack automatically and keep the shoes O.K. all the time, so you can

## FORGET

Brake Shoe troubles and reduce maintenance and inspection to the minimum.



Old-Style Construction Co.
Sleepy Hollow

Dear Sirs:

I saw your note in the June 2 issue. It woke me up to action.

I have looked with my own eyes at those S-W Brake Adjusters and I guess they save all you say they do. I didn't like them any less when I saw from their construction that they are automatic all the time and that they'll fit any style of truck or brake rigging.

Am at present working out exact fractional number of S-W Brake Adjusters required to = labor of each unnecessary man the government may now require.

Yours,
A. Railroad-Man.

**The Smith-Ward Brake Co., Inc.**
Whitehall Building, New York

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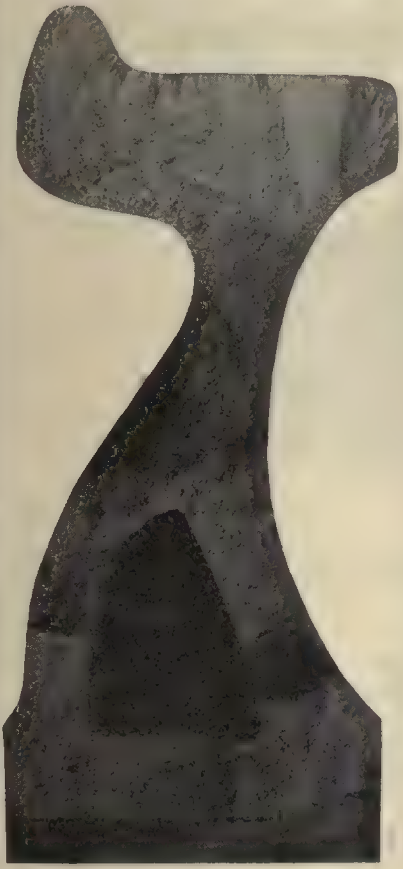

## This is the
# Griffin F. C. S. Wheel

The surface of tread and flange contains three and one-half per cent carbon white iron, harder than tool steel, insuring long wear.

The softer hub permits easy machining.

It is a wheel where the metal is so distributed that each part is particularly adapted to the requirements demanded of it.

The arched face plate gives additional strength.

Over 200,000 F. C. S. wheels are in use under city and interurban electric railway cars throughout the country.

The low friction between rail and flange keeps the flange wear and danger of derailment down to a minimum.

## GRIFFIN WHEEL COMPANY

**McCormick Building, Chicago, Ill.**

**FOUNDRIES**

**Chicago Detroit Boston Denver St. Paul**
**Los Angeles Tacoma Kansas City**

The new high speed interurban cars recently placed in service by the Jamestown, Westfield & Northwestern Railroad are fitted with Standard No. 1062 rolled steel wheels mounted on Standard axles.

*—Representative practice*

**STANDARD STEEL WORKS CO.**

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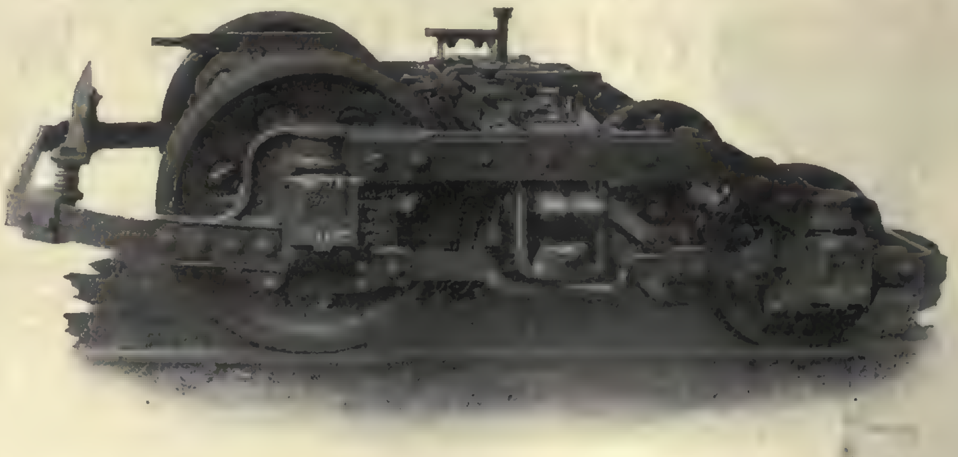
## TAYLOR MAXIMUM TRACTION TRUCK



## 12 FACTS REGARDING "TAYLOR-MADE" TRUCKS

- ABSOLUTELY SAFE
- RIDE LIKE PULLMANS
- SIMPLE IN CONSTRUCTION
- REDUCE WEAR OF MOTORS
- WILL INCREASE DIVIDENDS
- REDUCE COST OF MAINTENANCE

- SAVE POWER
- SAVE ROAD BED
- LIGHT IN WEIGHT
- OVERCOME FLANGE WEAR
- BRAKES DO NOT CHATTER
- PREVENT SIDE OSCILLATION OF CARS

**TAYLOR ELECTRIC TRUCK CO., TROY, N. Y.**

Established 1892

SPECIFICATIONS ON REQUEST

SEND FOR PORT-FOLIO

**Jewett** Let us furnish estimates on your standard specifications or suggest a design which we deem adaptable to your particular operating conditions. **Cars**

**The Jewett Car Co.**
**Newark, Ohio**

One of a recent shipment of trailer cars to the Salt Lake & Ogden Railway Company

1326

**EMB Grid Resistors**

**ARE MADE RIGHT AND STAY RIGHT**

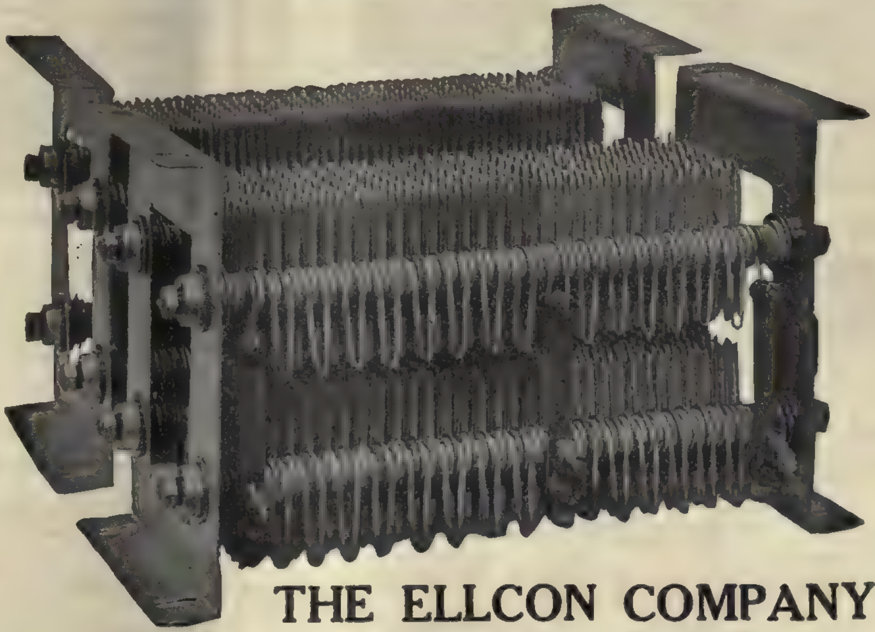
No resistors get more abuse than those under a car.

They are abused electrically by careless operation of the controller.

They are abused mechanically by exposure to dusty, muddy and stone-littered streets.

Until the arrival of E M B drawn, non-corroding grid resistors, troubles from these sources seemed unavoidable.

E M B grid resistors actually have made this part of your equipment troubleproof.



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Quick Shipments from our Minneapolis Yard
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The Trenton THREE SECTION TOWER
outfits for any make of chassis. Make a low, well-balanced outfit on the road with maximum elevation in use.
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Railway Feeders
And all kinds of Electrical Conductors
Aluminum feeders are less than one-half the weight of copper feeders and are of equal conductivity and strength. If insulated wire or cable is required, high-grade insulation is guaranteed. Write for prices and full information.
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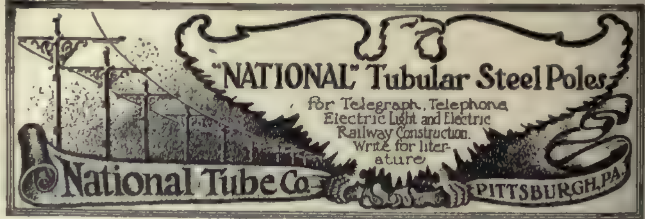
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DISPATCHER MOTORMAN
Direct Contact Between
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We brag about the SERVICE we give
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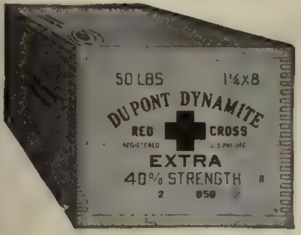


Load Bore Holes
with
Red Cross Extra
THE
UNIVERSAL EXPLOSIVE

Red Cross Extra Dynamite is a LOW FREEZING, all-the-year-'round, high efficiency explosive especially recommended

For Construction Work

It is made in all standard strengths from 20 to 60% and guaranteed to be as represented by cartridge markings.

Red Cross Extra Dynamites are as strong, stable and efficient as any other standard explosive.

If no test of Red Cross Extra has been made, make one at once—it is the least expensive and most efficient explosive.

Tell us what your blasting work is so that we can suggest how to use RED CROSS EXTRA efficiently and economically.

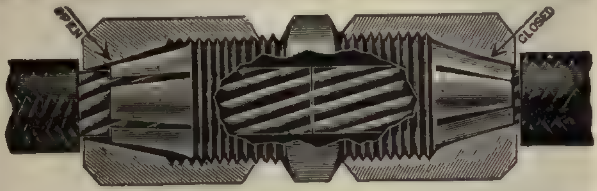
E. I. du Pont de Nemours & Co.
DU PONT Wilmington, Delaware DU PONT
Powder Makers Since 1802

STEEL POLES For Every Pole Purpose

Bates Steel Poles Ornamenting the Approach to the New Wisconsin State Capitol Building, Madison, Wis.

Strongest STEEL POLE of like weight in the world.
Best STEEL POLE in the world for electric railway trolley service, Power Transmission or Street Lighting.
Most artistic STEEL POLE in the world for any service.
We make the lowest prices.
We have constantly on hand about two thousand tons of steel and can make immediate shipments.
A full line of convenient malleable fittings.
*Our steel pole TREATISE tells a big story. Ask for it.*

BATES EXPANDED STEEL TRUSS CO.
208 South La Salle St., Chicago, Ill., U. S. A.



Makes Splices Easy to Open Up, Too

All you need is a wrench to open up a splice or make it up again, if you use

FRANKEL SOLDERLESS CONNECTORS

Wonderfully simple; Mechanically and electrically strong. Withstand big overloads. Get our booklet.

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Peirce Forged Steel Pins
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Your best insurance against insulator breakage
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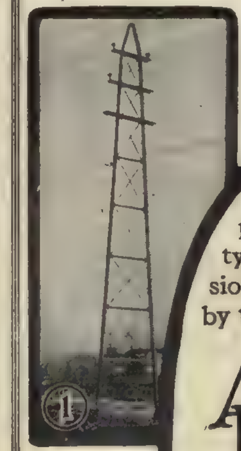
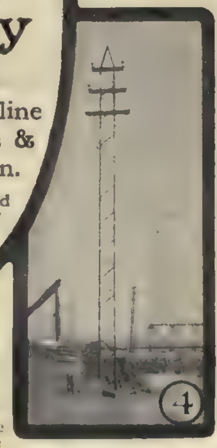
PITTSBURGH, PA.



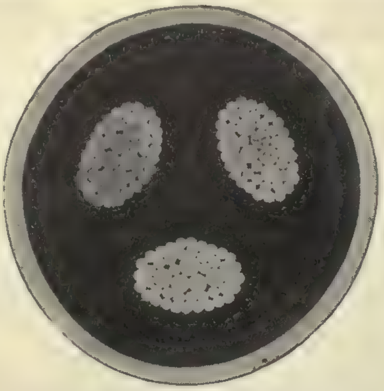
These photos show four types of transmission structures made by the

Archbold Brady Company
Syracuse, N. Y.
for the 33,000 volt line of the Empire Gas & Electric Corporation.

Various structures needed for complicated right of way conditions



1. "A" Frame
2. Angle Tower
3. Laced Angle Pole
4. Laced Channel Pole
1



Paper-Insulated, Lead Covered Cable with Modified-Sector-Shaped Conductors.

**THE Recognized Superiority** of STANDARD Electric Wires, Cables and Cable Accessories among those who have used them is due to our persistent and successful efforts for over 35 years to make them *standard* in quality as well as in name. Ask a user.

**Standard Underground Cable Co.**
**Pittsburgh, Pa.**

Boston Atlanta Cleveland Minneapolis
New York Washington Chicago St. Louis
Philadelphia Pittsburgh Detroit San Francisco
Seattle Los Angeles Salt Lake City

For Canada: Standard Underground Cable Co., of Canada, Limited, Hamilton, Ont.

KERITE
AN INVESTMENT

When you put your money into KERITE you make an investment in service. You do more than buy conductors, insulation and protection. You obtain the best possible combination of the most desirable qualities in permanent form. KERITE remains long after the price is forgotten.

KERITE INSULATED WIRE & CABLE COMPANY
NEW YORK CHICAGO

ATLANTIC WELDING COMPANY
30 CHURCH STREET
NEW YORK

**Universal Welding Equipments**

Most efficient, economic and especially adapted to all kinds of

**Railway Welding Operations**

for

Rail Joints, special work repairs, general shop welding, cupped rails, copper bonds, etc.

AWCo Trade Mark

*Write for particulars and prices*

SPECIAL TRACK WORK

Built to withstand severe service

SWITCHES
FROGS
CROSSINGS
and
COMPLETE
LAYOUTS

**New York Switch & Crossing Co.**
Hoboken, New Jersey

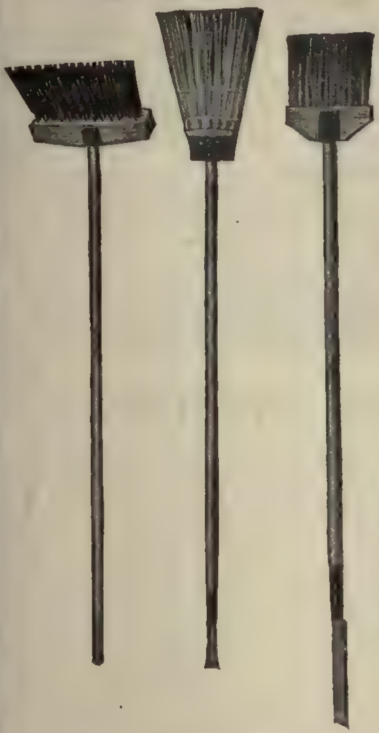
**American**
**Rail Bonds**

Crown
United States
Twin Terminal
Soldered

**American Steel & Wire Company**
Chicago New York Cleveland Pittsburgh Worcester Denver

Export Representative: U. S. Steel Products Co., New York
Pacific Coast Representative: U. S. Steel Products Co.
San Francisco Los Angeles Portland Seattle

A Great Combination



No. 1 to sweep crossings.

No. 2 to handle light dirt and snow in the frogs, switches, and curves.

No. 3 to remove ice, slush and mud from the same places and a chisel point on the end of the handle to loosen the ice and crust.

No. 1 and No. 3 contain Flat Steel Tempered Wire, and nothing superior can be produced. Serviceable all the year round. Your road is not complete without them.

*Write for Prices.*

J. W. PAXSON CO., Mfrs.
1021 N. Delaware Ave., Philadelphia, Pa.

"ACME" CORRUGATED METAL CULVERTS

make ideal storm-water sewers

They may be fitted with L's, T's, manholes, etc., and installed with or without concrete.

The illustration shows how highly Salt Lake City rates "ACME" Corrugated Culverts for this service. It's a 60-in. "ACME" storm water sewer installed in that city.

So if you think the use of "ACME" Culverts is confined to Highway Culverts and Railroads, it's a sure sign you need the "ACME" Catalog which gives the full list of possibilities.

*Write for a copy.*

THE CANTON CULVERT & SILO Co.
MANUFACTURERS
CANTON, OHIO, U.S.A.

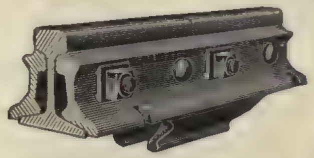
HIGHEST QUALITY
TRACK SPECIAL WORK

HIGHEST QUALITY SAFETY DURABILITY
FROGS CROSSINGS SWITCHES STANDS
C F&C Co.

WE MAKE THIS GRADE ONLY

CLEVELAND FROG & CROSSING CO.
CLEVELAND OHIO

The Rail Joint Company
61 Broadway, New York City



100% Rail Joint

Makers of Continuous, Weber, Wolhaupter and 100% Rail Joints
Standard—Insulated—Step—Frog and Switch Types
*Protected by Patents*
Grand Prize, San Francisco, 1915 4

SPECIAL TRACK WORK
For ELECTRIC RAILWAYS
THE AMERICAN FROG AND SWITCH CO.
HAMILTON, OHIO

T RAILS AND NELSONVILLE FILLER AND STRETCHER BRICK
offer all the advantages without the disadvantages of the groove rail.
Construction approved by City Engineers.
THE NELSONVILLE BRICK CO., Nelsonville, Ohio

Kilby Frog & Switch Co.
BIRMINGHAM, ALA.
Tongue Switches, Mates, Frogs, Curves and Special Work of all kinds for Street Railways

Railroad and Tram Car Specialties
New inventions developed, perfected and worked for the English market
Messrs. G. D. Peters & Co., Ltd.
Moorgate Works, Moorfields, LONDON, E. C.

SAFETY
For Protection Always
But we have made
TURBOIL
TRADE MARK
AND
W
GAS
CYLINDER OIL
The most popular
POWER-HOUSE
WORDS
because they carry
SAFETY
**BORNE, SCRYMSER COMPANY**
**80 SOUTH STREET, NEW YORK**

**Have You Ever Analyzed the Heap of Junk in Your Yard?**

Do you realize that a large percentage of the tubes, flues, and grates that compose it have had their uselessness hastened by bad feed water conditions?

Scale, Corrosion, Foaming, Pitting and Bagging quickly reduce boilers to junk. Overheating in an effort to offset the reduced steaming efficiency caused by scale, speedily burns out the tubes, and steam leaks produce bad effects on the grates, and also have a tendency to destroy the brick work of the furnace.

It is therefore easily appreciable that

**Dearborn Treatment**

which is a certain corrective for all feed water troubles, prolongs the life of not only the water containing parts of your boiler, but saves furnace parts as well.

*Dearborn Treatment* can be depended upon to keep the boilers in good condition. It is made in each case to handle the conditions shown by analysis of the water, and provides reagents for all the injurious mineral salts contained, so that it not only prevents scale formation, but overcomes corrosion, pitting and foaming.

**Dearborn Chemical Company**
**McCormick Bldg., Chicago**

The Babcock & Wilcox Company
85 Liberty Street, New York
WATER TUBE STEAM BOILERS
Steam Superheaters Mechanical Stokers
**Works: BARBERTON, OHIO—BAYONNE, N. J.**
**BRANCH OFFICES:**
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BOSTON, 35 Federal St.
CHICAGO, Marquette Building.
CINCINNATI, Traction Building.
CLEVELAND, New England Building.
DENVER, 435 Seventeenth St.
HAVANA, CUBA, Salle de Agular 104.
HOUSTON, TEX., Southern Pacific Bldg.
LOS ANGELES, I. N. Van Nuys Bldg.
NEW ORLEANS, 533 Baronne St.
PHILADELPHIA, North American Building.
PITTSBURGH, Farmers' Deposit Bank Bldg.
SALT LAKE CITY, 705-6 Kearns Bldg.
SAN FRANCISCO, Sheldon Bldg.
SAN JUAN, Porto Rico, Royal Bank Bldg.
SEATTLE, Mutual Life Building.
TUCSON, ARIZONA, Santa Rita Hotel Bldg.

**Foster Superheaters**
**Insure uniform superheat at temperature specified**
**Power Specialty Company**
**111 Broadway, New York City**

The **MODERN WAY** of handling **ASHES** is by the
GECO
**GECO**
**STEAM JET CONVEYOR**
**GREEN ENGINEERING CO.**
**East Chicago, Indiana**
Bulletin No. 1 Green Chain Grate Stokers.
Bulletin No. 2 Geco Steam Jet Ash Conveyors.

**WATER SOFTENING OR FILTRATION**
**FOR BOILER FEED AND ALL INDUSTRIAL USES**
WM. B. SCAIFE & SONS CO. PITTSBURGH, PA.

Murphy Automatic Furnace
CONSERVES energy and triples the steaming capacity of your boilers. Write for Catalog "C."
MURPHY IRON WORKS Detroit, Mich. U.S.A.
232

**In Time of Need**

"Union" Fuses prove their worth by giving real protection to your apparatus, for they are accurately rated and carry the underwriters' label service—the last word in thorough and impartial inspection.

A large saving can be effected by returning blown knife-blade fuses to our factory for reloading under the approval of the underwriters.

Catalog 28 contains complete descriptions of fuses and cutouts for railway service. Write for a copy.

**CHICAGO FUSE MFG. CO.**
**CHICAGO NEW YORK**

**I-T-E**
**Circuit Breakers**

Best in
Design, Construction, Material
For
Heavy Railway Service

*Write for Hand Book of the I-T-E Circuit Breaker which contains Circuit Breaker data for every Service*

**The Cutter Company**
**Philadelphia**

8507

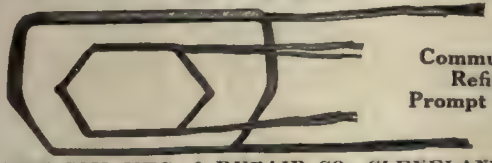
**Cameron Commutators Command Confidence. Why?**

Because of the dense, high conductivity hard-drawn copper we put into the bars,
Because of the best-there-is quality of high grade Canadian amber mica we use in insulating the segments,
Because of years of specialized, commutator-building experience that makes our workmen experts in their line,
Because of the Cameron ideal of quality—and the painstaking inspection that guarantees it in every job we turn out.
Specify CAMERON for commutators, segments or coils.

**Cameron Electrical Mfg. Co.**
**Ansonia, Connecticut**

7232

**Armature and Field Coils—Armatures Rewound**



**Commutators Refilled**
**Prompt Service**

THE COIL MFG. & REPAIR CO., CLEVELAND, OHIO

JACKS

Barrett Track and Car Jacks
Barrett Emergency Car Jacks
Duff Ball Bearing Screw Jacks
Duff Motor Armature Lifts

The Duff Manufacturing Co., Pittsburgh, Pa.

STANDARD
Woven Fabric Co.
Walpole, Mass.

**Last Word in Refillable Fuses** TRADE DAUM MARK

SAVE
**60 to 80 per cent.**
*Sole Manufacturer*
**A. F. DAUM**
**Pittsburgh, Pa.**

You will buy

CLEVELAND
Fare Boxes

Eventually—

Why not now?

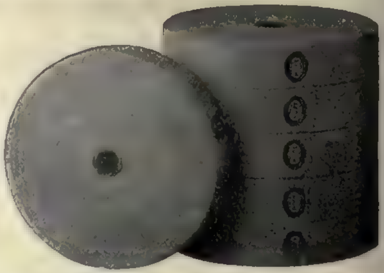
Cleveland Fare Box Co.
CLEVELAND, OHIO

HOPE Brand *for best results*

Webbings and Tapes made from the best raw materials—made with the most up-to-date machinery and most reasonably priced. That's what you get in Hope Products.

Send for samples.

HOPE WEBBING CO.
Providence, R. I. 396 Broadway, New York



Repair Shop
Machinery
and Cranes

Built by

NILES-BEMENT-POND CO.

111 Broadway, New York

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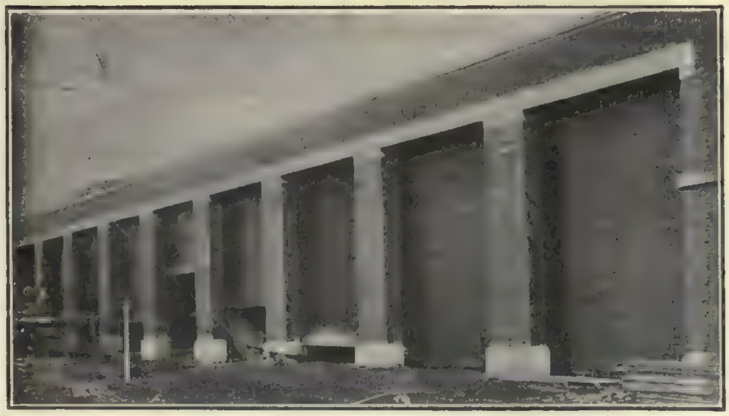
St. Louis Birmingham, Ala. London

Awebco
TRADE MARK REG'D

Tapes and Webbings are produced according to the specifications laid down by Railway Motor Manufacturers. Popular with manufacturers of motors because always right as to width and thickness of material, breaking strength, yarns, warp ends, and other standard requirements. The prices and material invariably satisfactory.

Anchor Webbing Co.
Mill & Office, Woonsocket, R. I.

**Representatives:** Chicago—E. P. Bartlett, 1368 Grand Ave. St. Louis—Brown & Hall, 620 Central Nat. Bk. Bldg. Cleveland, Ohio—R. S. Mueller, 423 High Ave., S. E.



KINNEAR
Steel and Wood
Rolling Doors

For Car Houses and Power Houses

Write for new Catalog "M" and Booklet "Car House Doors."

The Kinnear Mfg. Co., Columbus, O.
Boston Philadelphia Chicago

Full power with
High or Lower Adjustment

Many emergencies requiring a powerful jack present a difficulty in bringing the jack to bear on the load. The

Buckeye Emergency
Jack No. 239 Special

saves time, strength and trouble. The many positions to which it is adjustable easily solve perplexing lifting problems. Full details in our catalog. Write for it.

The Buckeye
Jack Mfg. Co.
Alliance, Ohio

THE BUCKEYE JACK MFG CO ALLIANCE, O.

*Replies to*
"WANT" and "FOR SALE"
*Advertisements*

in this paper may be keyed to our

CHICAGO, PHILADELPHIA or SAN FRANCISCO

office, if preferred, and these replies will be mailed promptly each day to the advertisers the same as though received at our New York office.

ELECTRIC RAILWAY JOURNAL, 239 W. 39th St., New York
935 Real Estate Trust Bldg., Philadelphia
501 Rialto Bldg., San Francisco
1570 Old Colony Bldg., Chicago

## The subscription was discontinued because a "Want" Advertisement brought results

Editor—"We are sorry to lose your subscription, Mr. Jackson. What's the matter? Don't you like our politics?"

Mistah Jackson—" 'Tain't dat, sah; 'tain't dat. Mah wife jes' been an' dun landed a job o' wuk for me by advertisin' in youh darned ole papah."

If you're looking for a " job o' wuk" in the electric railway field—

—if you're looking for a competent man who will be able to handle a big or a little "job o' wuk" and who will bring RESULTS—

—there is no more efficient or economical method of securing either than the insertion of a card in the

SEARCHLIGHT SECTION

Copy for "Want" and "For Sale" cards can be received on Wednesday for issue out on Saturday.

ELECTRIC RAILWAY JOURNAL
239 West 39th Street, New York

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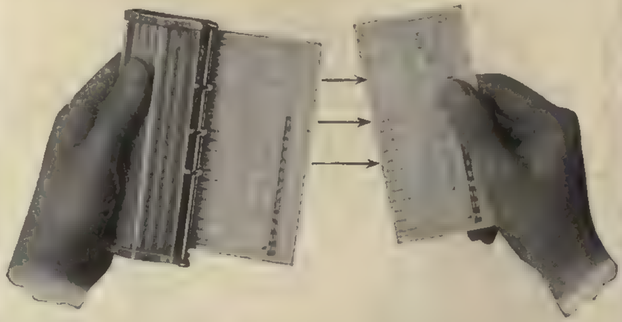

The need of an efficient fare system is universally felt.

This is evidenced by the fact that we receive inquiries from every part of the globe—Solomon Islands, Spain, Japan, Holland, England, South America, Mexico.

## The Macdonald
### Ticket and
### Ticket Box System

will fill this long-felt need, efficiently—economically. What about *your* fare system?

**The Macdonald Ticket & Ticket Box Co.**
**Cleveland, Ohio**

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## The Solution of Your Insulation Problem

is to be found in the insulating materials listed here, or in some one or more of the many other products of our plant. To take fullest advantage of the insulation service we offer, you should know the complete line.

PERFECT MICANITE INSULATOR REGISTERED

*Write today for descriptive bulletins.*

| MICANITE | EMPIRE | LINOTAPE | KABLAK | MICO |
|---|---|---|---|---|
| Commutator Insulators, Tubes, Washers, Rings, Segments, Sheets, Tapes, etc., made of imported mica | Linseed oil treated Cambric, Linen, Silk, Canvas, Duck and Papers. High puncture voltage, long life. | Linseed oil coated tape both straight and bias cut for coil winding, cable splicing, bus bars, etc. | Black varnished Cambric, Linen, Silk, Canvas, Duck & Papers, Flexible, efficient under high temperature. | Untreated insulating fabrics, Papers, Fibres, Linen Tapes, Sleeves, Shellacs, Cements and Varnishes. |

New York
68 Church St.

**MICA INSULATOR CO.**

Chicago
542 So. Dearborn St.

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### The Best Shade Rollers for Cars

SPECIAL shade rollers for cars, that will last and give satisfaction for years, and yet cost but little more than the poorest you can buy, are made by the Stewart Hartshorn Co., E. Newark, N. J. This company is by far the largest shade roller manufacturer in the world. It is able to give high quality at lower prices because of the enormous output. Write for catalog, stating wants. You are always protected when you buy shade rollers if they bear the signature Stewart Hartshorn

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## COMMUTATORS

Original Manufacturers' Dimensions

Write for new bulletin

THE EUREKA CO., North East, Pa.

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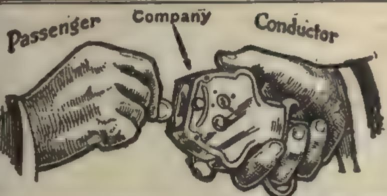

Direct
Automatic
Registration
By the
Passenger

Rooke Automatic
Register Co.
Providence, R. I.

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### Ventilation—Sanitation—Economy—Safety

*All Combined in*

The Cooper Forced Ventilation Hot Air Heater

*Patented September 30, 1913. Ask for the full story*

We also Manufacture Pressed Steel Hot Water Heaters

THE COOPER HEATER CO. CARLISLE, PA.

**HENSLEY**

**Fool-Proof Trolley Harps**

Make it an easy matter, whether it is day or night, to replace your pole after it has jumped the trolley wire. See those protecting ears. They prevent the wire from lodging any place but in the wheel slot. If your pole doesn't jump up on release you're sure it's right.

For trouble-less overhead contact—a Hensley Trolley Harp plus a Hensley Trolley Wheel.

**Hensley Trolley & Mfg. Co.**
**Detroit, Mich.**

*Get away from unreliable batteries*

**The Consolidated Buzzer System**

operates directly from the line and always gets plenty of juice. No metal is exposed to the passenger's touch.

The only dependable system.

**Consolidated Car-Heating Co.**
**New York Albany Chicago**

Our forty years of successful punch making are well demonstrated in the perfection of our product, which is Standard throughout the world.

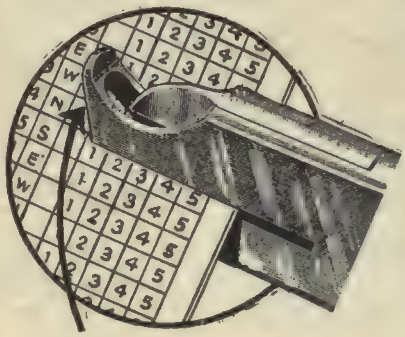
These punches prove the most efficient, because they operate quickest and easiest, and the most economical because they wear longest.

Let us show you WHY.

Punchmakers since '72.

**R. Woodman Mfg. & Supply Co.**
82 Sudbury St., Boston, Mass.

E. G. Long Co., 50 Church St., New York City
Eastern Electrical and Export Representatives.



**See through it!**

*That's what you can do with a*

**BONNEY-VEHSLAGE VISIBLE PUNCH**

That's what makes them so popular with your conductors.

That's why with B-V Punches your collectors, transfer and ticket agents can handle the big crowds quickly and efficiently.

And B-V Punches have the stuff in them—they last.

Send for prices and catalog.

**Bonney-Vehslage Tool Co.,** 124 Chambers St., N.Y.
Factory, Newark, N. J.

WE CAN CUT YOUR COST OF
**HEATING CURRENT**
Write for THERMOSTATIC CONTROL INFORMATION

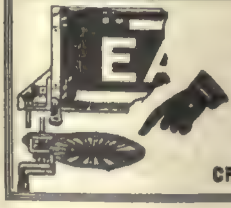
**GOLD**

ELECTRIC HEATERS Cut Installation and Maintenance Charge.
VENTILATORS Also Ventilate in Stormy Weather.
THERMOSTATS Save Current.
ORIGINATED the use of NON-CORROSIVE Wire for Electric Car Heaters.
ORIGINATED The Ventilated Coil Support.

LET US FIGURE ON YOUR NEXT REQUIREMENTS
**Gold Car Heating & Lighting Co. 17 Battery Pl., New York**

**RAILWAY UTILITY COMPANY**
*Sole Manufacturers*
"HONEYCOMB" AND "ROUND JET" VENTILATORS
for Monitor and Arch Roof Cars, and all classes of buildings; also
ELECTRIC THERMOMETER CONTROL
of Car Temperatures.

141-151 WEST 22D ST., Chicago, Ill.
*Write for Catalogue*
1328 BROADWAY New York, N. Y.



See the Crank of the

**CREAGHEAD DESTINATION SIGN**

By means of it, conductor or motorman can change sign without leaving platform. All that has to be done is to turn the crank. Better investigate.

**CREAGHEAD ENGINEERING CO., CINCINNATI, O.**

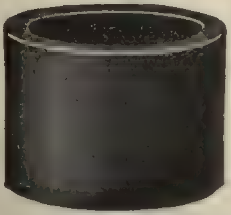
STUCKI
SIDE BEARINGS

are truly frictionless. The roller instead of turning on a pin rolls freely like a rolling pin.

**A. Stucki Co.**
Oliver Bldg.
Pittsburgh, Pa.

LONGWEAR BUSHINGS
For Brake Gear

Hardened
Steel
Accurate
Uniform



also
LONGWEAR
BRAKE PINS
to
Specifications

**E. G. Long Company**
50 Church Street New York

ROLLER LOCK NUT CO. N.Y.
PAT'D. JAN. APR. 21, 1914.

Once Tight They STAY

They cannot work loose. They are the first and only self-tightening lock nut. As essential for track as for truck.

*Fool Proof and Used Alone*

**Roller Lock Nut Co.**
61 Broadway, New York

Get Our
Price Lists on
BADGES and
PUNCHES

AMERICAN RAILWAY SUPPLY CO., 134-136 Charles St., NEW YORK

THE AMERICAN CARBON AND GRAPHITE MOTOR AND GENERATOR BRUSH line is complete, including grades of stocks suitable for any service.

AMERICAN CARBON & BATTERY WORKS E. ST. LOUIS, ILL.
OF NATIONAL CARBON CO., INC.

*This one bearing*
*does the work of two*

It carries both radial and thrust loads and obviates the need for two separate bearings. It has big load capacity, too—this gives it a large factor of safety and long life.

172 ***Full information on request.***

**GURNEY**
**BALL**
**BEARINGS**

**Gurney Ball Bearing Co.**
Conrad Patent Licensee
Chicago Jamestown, N. Y. New York

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## It takes you safely 'round Curves and over Crossings

Overhead the Simplex No. 2 Trolley Base keeps the wheel on the wire no matter how fast the turn is taken.

The roller bearing base assures easy turning. At crossings the wheel never jumps because the "higher the wire—more the tension" feature holds it tight against the trolley.

### Simplex No. 2 Trolley Base

The ordinary trolley base gives 32 pounds tension at normal height and 16 pounds at crossings. The Simplex gives 32 pounds normal and 40 pounds at crossings.

The juice will never fail when you need it with a Simplex Base overhead.

*Send for Bulletins.*

**The Trolley Supply Co., Canton, Ohio**

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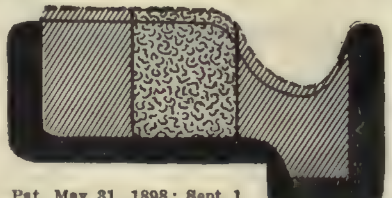
## Wheel Condition No. 1

When only the inner portion of the tread needs grinding — here's the style of



Pat. May 31, 1898; Sept. 1, 1903; Aug. 2, 1904; Dec. 29, 1908; June 15, 1909; April 21, 1914.

**WHEEL TRUING BRAKE SHOE**

that will correct the difficulty without removing the car from service.
We have a shoe to fit any style of head any sized wheel.

**Wheel Truing Brake Shoe Co.**
**DETROIT MICHIGAN**

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**UNIVERSAL ANTI-SLIP TREADS**
cars and station steps.

**Universal Safety Tread Company**
**Waltham, Mass.**

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**MASON SAFETY TREADS**—prevent slipping and thus obviate damage suits.

**KARBOLITH CAR FLOORING**—for steel cars is sanitary, fireproof and light in weight.

**STANWOOD STEPS**—are non-slipping and self-cleaning.

Above products are used on all leading railways. For details address

**AMERICAN MASON SAFETY TREAD CO.**
Main Offices: Lowell, Mass.
Branch Offices: Boston New York City, Chicago, Philadelphia, Kansas City, Cleveland, St. Louis.

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**Samson Bell and Register Cord**

Solid braided cotton, extra quality. All sizes and colors. More durable, more economical and better looking than leather or rawhide. Send for samples and full information.

SAMSON CORDAGE WORKS BOSTON, MASS. 2

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Saved from the Ashes as many tickets are, means nickels loss to you. Avoid the risk.

Patten Ticket Destroyer is used right in the office under the eyes of trustworthy employes.

It mutilates beyond redemption.
Scrap sold will pay for the machines.

*Ask us for Circular J.*

**PAUL B. PATTEN CO.**
**78 Lafayette St., Salem, Mass. U.S.A.**

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SPECIFY "GLOBE"

**Globe Ventilator Co.**
**Troy, N. Y.**

**Ventilators On New Cars**

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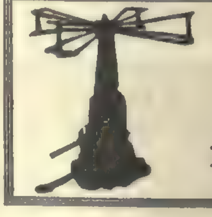

**Use them in your terminals—**

**PEREY TURNSTILES**
**or PASSIMETERS**

***Faster than the ticket seller***

**Perey Manufacturing Co., Inc.**
**30 Church Street, New York City**

# SEARCHLIGHT SECTION

## Get your Wants into the Searchlight

### ADVERTISING RATES

Under "Positions Wanted," including Salesmen looking for new connections, Evening Work Wanted, etc., undisplayed advertisements cost **three cents a word,** minimum charge 50 cents an insertion, payable in advance; less 10% if one payment is made in advance for 4 continuous insertions.

Under "Positions Vacant," including Agents and Agencies Wanted, Representatives Wanted, Salesmen Wanted, Partners Wanted, Business Opportunities, Employment Agencies, and Miscellaneous For Sale, For Rent, and Want ads; also Auction Notices, Receivers' Sales, Machinery and Plants For Sale or Wanted, undisplayed advertisements set solid in one paragraph, cost **five cents a word,** minimum charge $1.50 an insertion.

Machinery advertisements (undisplayed) set with a paragraph for each item, or tabulated, 30 cents a line, minimum 5 lines.

If replies are in care of any of our offices, allow five words for the address.

All advertisements for bids (Proposals) cost $2.40 an inch.

### ADVERTISEMENTS IN DISPLAY TYPE

cost as follows for single insertions:

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| $\frac{1}{16}$ p. ($1\frac{1}{8}$x$3\frac{3}{8}$ ins.) | $5.00 | 1 in. (1x$2\frac{3}{16}$ ins.) | $3.00 |
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For space to be used within one year, to be divided to suit requirements of advertiser, provided some space is used at least once a month following first insertion:

| | | | |
|---|---|---|---|
| 1 page | $80 a page | 18 pages | $56 a page |
| 3 pages | 72 a page | 26 pages | 52 a page |
| 6 pages | 64 a page | 32 pages | 50 a page |
| 9 pages | 62 a page | 40 pages | 48 a page |
| 12 pages | 58 a page | 52 pages | 45 a page |

In replying to advertisements, do NOT enclose original testimonials, or anything that you may want returned.
State your qualifications in as concise and neat a manner as you can and enclose COPIES of testimonials.
In machinery ads, use a local name or address if possible so that readers can wire direct and get quick replies.

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### MISCELLANEOUS WANTS

#### Wanted at Once

For immediate shipment any quantity of battery lead plates, sediment scrap copper and wire, brass and all other grades of scrap material. Write to us today for our prices. National Metal & Rubber Co., 31 India Wharf, Boston, Mass.

### POSITIONS WANTED

AUDITOR, secretary or treasurer of interurban road; 15 years' experience; fully acquainted interstate commerce commission requirements; furnish excellent references and bond as required. (Ind.) PW1574, Elec. Ry. Journal, Chicago.

COPPER zone fare collection. I have successfully handled this system for three years, and can do the same for you. Get a specialist and anticipate your needs. (Conn.) PW1565, Elec. Ry. Journal, N. Y. C.

PURCHASING agent of seventeen years' experience, now employed, desires position with large property; thoroughly competent. Familiar with organizing and conducting storeroom. Can give A1 references from present and past employers as to character and ability. (Ala.) PW1585, Elec. Ry. Journal, Philadelphia.

### ADVERTISEMENTS ARE KEYED

to our office nearest the advertiser. The advertiser's location is indicated by the state abbreviation preceding the box number.

### IN REPLYING

be careful to put on envelope the key number in the ad. and also local address of office to which reply is sent.

239 West 39th St., New York.
1570 Old Colony Bldg., Chicago.
657 Leader-News Bldg., Cleveland.
935 Real Estate Trust Bldg., Phila.
501 Rialto Bldg., San Francisco.

### IMPORTANT

Original letters of recommendation or other papers of value should not be enclosed to unknown correspondents—send copies.

### POSITIONS VACANT

ARMATURE winders. Permanent positions. Best working conditions. Address (Ind.) P1580, Elec. Ry. Journal, Cleveland.

ARMATURE winder wanted for street railway work; one that can do general repairs about shop and cars. H. Meyer, care of Beaver Valley Traction Co., New Brighton, Pa.

MAN wanted for central station distribution system. Must be experienced in high and low tension overhead line construction. Give age, experience and salary expected. (Pa.) P1583, Elec. Ry. Journal, Philadelphia.

### POSITIONS VACANT

SHOP foreman wanted for road operating about 25 suburban cars; all up to date equipment. Give experience and salary expected. Married man preferred (Ill.) P1586, Elec. Ry. Journal, Chicago.

### AGENTS AND SALESMEN

#### Wanted by Large House

Salesman Wanted by large manufacturing and jobbing supply house, specializing in electric railways, mine and industrial electrical supplies. Man with experience in these particular lines with some technical education preferred. In replying give full details concerning past experience. (Pa.) S1593, Elec. Ry. Journal, Philadelphia.

### EMPLOYMENT AGENCIES

#### Correspondence Service

The undersigned provides a confidential service designed to locate openings through correspondence for men earning not less than $2,500 and up to $25,000; all lines. Not an employment agency, but a constructive, initiative service, covering individual negotiations. Established 1910. Complete privacy assured; present connections in no way jeopardized. Send name and address only for explanatory details. R. W. Bixby, H1 Niagara Square, Buffalo, N. Y.

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# If there is anything you want—

or something you don't want that *other* readers of this paper can supply—or use—advertise in the

## Searchlight Section

*NOW*— is the time to offer good second-hand equipment or machinery for sale. The demand is great for good plant for immediate delivery. That's why you should advertise NOW.

*NOW*— or any other time, use the Searchlight Section for advertising

Agencies Wanted
Agents Wanted
Auction Notices
Buildings For Sale
Business Opportunities
Civil Service Opportunities
Contracts To Be Let
Contracts Wanted
Educational Courses
Employment Agencies
Exchanges
For Rent Items
Franchises
Industrial Sites
Miscellaneous Wants
New Industries Wanted
Partners Wanted
Patents For Sale
Patent Attorneys
Plants For Sale
Positions Vacant
Positions Wanted
Property For Sale
Receivers' Sales
Representatives Wanted
Salesmen Wanted
Work Wanted
Etc., Etc., Etc.

# SEARCHLIGHT SECTION

## FOR SALE

### MOTORS

4—W. H. 38-B **Motors**, complete with gears, pinions and gear casings.

12—W. H. 68 **Motors**, complete with gears, pinions and gear casings.

8—G. E. 80 **Motors**, complete with gears, pinions and gear casings.

10—G. E. 67 **Motors**, complete with gears, pinions and gear casings.

12—G. E. 73 **Motors**, complete with gears, pinions and gear casings.

### CONTROLLERS

12—W. H. K-6 **Controllers.** 20—K-11 **Controllers.**
30—K-10 **Controllers.** 10—K-28-B **Controllers.**

### COMPRESSORS

25—AA-1 Air **Compressors.**

### GEARS

51—Solid Gears, 68 teeth, 3⅞" rough bore, machined from Carnegie rolled steel blanks, standard hub, for W. H. 12-A, 68, 56 and 49 Motors. Can be bored for 4½" axle.

### LATHE

1—Pond Car Wheel **Lathe**, motor driven.

**For further particulars apply to**

**W. R. KERSCHNER COMPANY, INC.**
**50 Church Street, New York, N. Y.**

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## THREE

1500 KVA. 25 Cycle

Single Phase

## WESTINGHOUSE TRANSFORMERS

Oil Insulated Water Cooled

33,000/2,300 Volts

**MACGOVERN & COMPANY**
**INC.**
**114 Liberty Street New York, N. Y.**

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## IMMEDIATE SHIPMENT

1—500 KW. General Electric Curtis steam turbine, 3 ph., 60 cy., 1800 rpm., 2300 volts, 150 lb. steam pressure, vertical type.

1—500 K.W. Westinghouse Horizontal Turbo Generating Unit wound for 3 phase, 60 cycle, 2300 volts, speed 3600 rpm., condensing duty.

### 25 Cycle Rotary Converters

2—150 KW. General Electric type T.C., 4-150-750, 25 cycle, 3 ph., 575 volt, rotary converters, 750 rpm., complete with end play and speed limit device.

### 200 Kilowatt 60 Cycle Rotary Converters

1—200 KW. Westinghouse 3 ph., 60 cy. rotary converters, 550 volts, 720 rpm., complete with 4—100 KW. Westinghouse Scott connected oil insulated transformers, 10,000/9500 volts prim., 430/362 volts secy.

1—150 KW. Westinghouse 3 ph., 60 cy., rotary converter, 550 volts, 720 rpm.

### Transformers

6—750 KVA. General Electric oil filled self cooled transformers, 4400/281 volts, with 4400-4290-4180-4070-2200-2090-1980 taps in the primary.

3—500 KW. General Electric, 60 cy., single phase transformers, 66,000 volts primary, 4400/2200 volts secondary.

3—375 KVA. Allis Chalmers O. I. S. C. indoor type transformers, 25 cy., 2300 v., 367 v. secy.

3—350 KVA. General Electric, type H, 60 cy., transformers 2400/2300/2200 v. prim., 200/400 v. secy.

1—100 KVA. General Electric, type H, 60 cy. transformer, 4600 volts prim., 115-230 volts secy.

4—100 KW. Westinghouse, oil insulated, Scott connected transformers, 10,000/9500 v. prim., 430/362 v. secy.

3—75 KW. Westinghouse 60 cy. transformers, 2200 v. prim., 110/220/440 v. secy.

3—50 KVA. General Electric type H, 60 cy. transformers, 900/1000/16000 v. prim. Y., 230/460 v. secy.

Also a stock of smaller sized transformers.

IMMEDIATE DELIVERY

**ARCHER & BALDWIN, Inc.**
**114-118 Liberty Street New York City**
TELEPHONE 4337-4338 RECTOR

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## FOR SALE

### Jet Condenser

Never been used. No. 6 Davidson; Copper spray pipe and Davidson patent vacuum breaker; brass fitted pump, 12-in. and 18-in. x 20-in. stroke. Suitable for 850 H.P. engine.

### New Copper Feeder

Approx. ½ mile, 300,000 C.M. 19 strand, bare, on original reel.

### Motor Driven Railway Booster

Direct current booster, 50 K.W., 240 volts at 208 amps., direct driven by type "C" induction motor, 75 H.P., 3 phase, 25 cycles, 390 volts, 480 R.P.M. Westinghouse manufacture; first-class second hand condition.

### O I S C Westinghouse Single Phase Transformer

150 K.W. 25 cycles, primary volts 16,000-13,000, secondary volts 390-314; without oil. First class condition. Only one year in service.

**E. F. GOULD, 1201 Guardian Bldg., Cleveland, Ohio**

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## FOR SALE

## New 300 K.W. Rotary

Complete G.E. Rotary, 1200 R.P.M., 600 V., 3 Ph., 60 Cyc. Field Winding C.W. 150% 2 Hour Overload. Weight 13,000 Lbs. Type TC. Six Poles. 500 Amperes, Includes Transformers, Switchboard, etc., all complete for substation.

Transformers, Type HR, 100 KVA, 60 Cyc. Primary Volts 15000/26000Y, Secondary Volts 370. Amps. at Full Voltage 270 each. Trans. designed for Y connection on 26,000 V. cir. Taps provided for additional approximate voltages Primary 14400, 13800/13200/1300. Secondary 50% starting. Oil cooled. Net weights Trans. 4800 Lbs. Oil 1150. Height over leads 90 in. Floor space 46 x 31 ins. 15% Inherent Reactance. This substation now installed and will be demonstrated on actual working load for customer. Immediate delivery. Cash. Price complete $5,500.

## Car For Sale

52 Ft. 3 Compart. Trolley Car. West. HL 506 Equipment. Excellent condition. Immediate release from service. New Motor Bearings all around (Ind.) FS1588, Elec. Ry. Journal, Chicago.

# SEARCHLIGHT SECTION

**85 lb. A. S. C. E. Relayers**

16,000 tons—with Angle Bars to match. Available immediate shipment and centrally located.
We positively own these Rails and offer same in carload lots and over.
25,000 tons—Relayers—sizes 25 lb. to 100 lb., in stock our Pittsburgh yards and vicinity.
Immediate shipment guaranteed and prices very attractive.
Carload and less than carload inquiries and orders solicited.
Rails cut to length for structural purposes.
Frogs, Switches, Bolts, Nuts, Spikes and all Accessories.

**L. B. FOSTER COMPANY**
Park Bldg Pittsburgh, Pa.

RAILS CARS

**Dollar-Saving Bulletin**

Send for the last one, No. 219—the best 2c. investment you ever made.

**ZELNICKER IN ST. LOUIS**

EQUIPMENT MACHINERY

FOR SALE

**Used Cars**

5—Single Truck, two motor, closed cars, 32' overall, Westinghouse No. 68 motors, K. 11 controllers, hand brakes—cast wheels 30".

1—Single Truck, two motor, closed car, 32' overall, G. E. No. 1000 motors, 30" steel wheels, K. 11 controllers.

**Manhattan Bridge Three Cent Line**
333 Gold Street, Brooklyn, N. Y.

**Armature Coil Taping Machine**

Saves Time, Labor and Money

A boy can tape 40 coils for Westinghouse 12A Armature in an hour. Further particulars gladly furnished.

**Geo. M. Griswold Machine Co.**
New Haven, Conn.

OPEN and CLOSED
MOTOR and TRAIL

*Write for Price and Full Particulars to*

**ELECTRIC EQUIPMENT Co.**
601 Commonwealth. Bldg Phila Pa

WANTED

**Motor Generator**

Motor, 3 phase, 60 cycles, Generator, 500 volts, direct current of about 200 K.W. capacity. (Ont.) M1578, Elec. Ry. Journal, N. Y. C.

**IMMEDIATE SHIPMENT**

1—300 K.W. Westinghouse, compound wound, 3 bearing, belt-driven

**Generator**

speed 435 R.P.M., 550 volts.

**LEO A. PHILLIPS**
Steam & Electrical Equipment
90 West Street New York City

**IMMEDIATE SHIPMENT**

100 tons of 62 lb. Shanghai rails, together with bars, rails practically as good as new, ready for quick shipment.
Also one direct connected Ridgway Dynamo and Engine, 200 volt, 550 KW., as good as new. Wire for prices.

**M. K. FRANK**
**Frick Building, Pittsburgh, Pa.**

FOR SALE

**Overhead Steel Bridge**

Skew 63° 8'. Designed for two 60-ton Interurban cars. Main span of two through plate girders 53 feet long supported on four channel columns. Approaches of four 24" 80-lb. I-beams, average length 29 ft. 6 in. Will sell entire bridge or any separate member.

**Indiana Railways & Light Company**
Kokomo, Indiana.

**CLEVELAND ARMATURE WORKS**
Cleveland, Ohio

**Everything in the Line of Repairs to Electrical Machinery**

Complete Armatures, New Armatures, Rewound Armature Cores, Armature Shafts, Armature Coils, Fields and Commutators.

Established 22 Years.

*Keep Your Eyes on the Searchlight Section and your Ad in it*

FOR SALE
**300 "A" Frame**
and
**One Square, Black Iron Archbald**

**Flexible Towers**

in exceptionally good condition, having been painted during last Spring and never been in service. "A" Frame Tower weighs complete 1800 lbs., square tower 3700 lbs. complete. For further detailed information

Address PURCHASING AGENT
Alabama Power Company
Birmingham, Alabama

**Generating Units**
FOR SALE

Two 500-hp. Bass Corliss cross-compound Steam Engines direct connected to Westinghouse Generators, 375 kw., 550-volts.

First-class running condition.

Will be sold cheap.

**Federal Iron & Steel Company**
Newark, N. J.

**60 lb. RELAY RAILS**

70 tons ASCE 60 lb. rail in 60-ft. lengths, practically good as new. Immediate shipment.

**RELIANCE EQUIPMENT CO.**
MOBILE, ALA.

Your Advancement

is largely in your own hands—it is doubtful if anyone else is worrying over it

Better positions are constantly being secured through small advertisements in the "Positions Wanted" Columns.

60 cents for 20 words

# WHAT AND WHERE TO BUY

## Equipment, Apparatus and Supplies Used by the Electric Railway Industry with Names of Manufacturers and Distributors

**Acetylene Service and Apparatus.**
Oxweld Acetylene Co.

**Advertising, Street Car.**
Collier, Inc., Barron, G.

**Air Cleaners and Rectifiers.**
Horne Mfg. Co.

**Alloys, Steel & Iron (See also Bearings and Bearing Metals.)**
Titanium Alloy Mfg. Co.

**Anchors, Guy.**
Electric Service Supplies Co.
Holden & White, Inc.
Ohio Brass Co.
Westinghouse Elec. & M. Co.

**Anti-Climbers.**
Railway Improv. Co.

**Automobiles and Buses.**
Brill Co., The J. G.

**Axle Straighteners.**
Columbia M. W. & M. I. Co.

**Axles.**
Bemis Car Truck Co.
Brill Co., The J. G.
Carnegie Steel Co.
National Railway Appliance Co.
National Tube Co.
St. Louis Car Co.
Standard Steel Works Co.
Taylor Electric Truck Co.
Westinghouse Elec. & M. Co.

**Babbitting Devices.**
Columbia M. W. & M. I. Co.

**Badges and Buttons.**
American Railway Supply Co.
Electric Service Supplies Co.
International Register Co., The.
Woodman Mfg. & Supply Co., R.

**Bankers and Brokers.**
Coal & Iron National Bank.
National City Co.

**Batteries, Storage.**
Electric Storage Battery Co.

**Bearings and Bearing Metals.**
Bemis Car Truck Co.
Columbia M. W. & M. I. Co.
Eureka Co.
General Electric Co.
Kerschner Co., Inc., W. R.
Long Co., E. G.
More-Jones Brass & M. Co.
St. Louis Car Co.
Taylor Elec. Truck Co.
Westinghouse Elec. & M. Co.

**Bearings, Center and Roller Side.**
Baldwin Locomotive Works.
Holden & White, Inc.
Stucki Co., A.

**Bearings, Oil-less, Graphite, Bronze and Wood.**
Bound Brook Oil-less Bearing Co.

**Bearings, Roller and Ball.**
Gurney Ball Bearing Co.
Railway Roller Bearing Co.

**Bells and Gongs.**
Brill Co., The J. G.
Columbia M. W. & M. I. Co.
Electric Service Supplies Co.
St. Louis Car Co.

**Benders, Rail.**
Niles-Bement-Pond Co.
Watson-Stillman Co.
Zelnicker Supply Co., W. A.

**Blasting Powder & Equipment.**
Du Pont de Nemours & Co., E. I.

**Boiler Cleaning Compounds.**
Dearborn Chemical Co.

**Boiler Graphite.**
Dixon Crucible Co., Joseph.

**Boiler Tubes.**
National Tube Co.

**Boilers.**
Babcock & Wilcox Co.

**Bond Testers.**
American Steel & Wire Co.

**Bonding Apparatus.**
Electric Railway Improve. Co.
Lincoln Bonding Co.
Ohio Brass Co.
Oxweld Acetylene Co.

**Bonding Tools.**
American Steel & Wire Co.
Electric Railway Improve. Co.
Electric Service Supplies Co.
Ohio Brass Co.

**Bonds, Rail.**
American Steel & Wire Co.
Electric Railway Improve. Co.
Electric Service Supplies Co.
General Electric Co.
Lincoln Bonding Co.
Ohio Brass Co.
Westinghouse Elec. & M. Co.

**Book Publishers.**
McGraw-Hill Book Co., Inc.

**Boring Tools, Car Wheel.**
Niles-Bement-Pond Co.

**Braces, Rail.**
Kilby Frog & Switch Co.

**Brackets and Cross Arms. (See also Poles, Ties, Posts, Piling and Lumber.)**
American Bridge Co.
Bates Expanded Steel Truss Co.
Creaghead Engrg. Co.
Electric Ry. Equipment Co.
Electric Service Supplies Co.
Hubbard & Co.
Lindsley Bros. Co.
Ohio Brass Co.

**Brake Adjusters.**
Holden & White, Inc.
Smith-Ward Brake Co.

**Brake Shoes.**
American Brake S. & Fdy. Co.
Bemis Car Truck Co.
Brill Co., The J. G.
Columbia M. W. & M. I. Co.
Long Co., E. G.
St. Louis Car Co.
Taylor Elec. Truck Co.
Wheel Truing Brakeshoe Co.

**Brakes, Brake Systems and Brake Parts.**
Bemis Car Truck Co.
Brill Co., The J. G.
Columbia M. W. & M. I. Co.
General Electric Co.
Holden & White, Inc.
Horne Mfg. Co.
Long Co., E. G.
National Brake Co.
St. Louis Car Co.
Safety Car Devices Co.
Taylor Elec. Truck Co.
Westinghouse Trac. Brake Co.

**Bridges & Buildings.**
American Bridge Co.

**Brooms, Track, Steel or Rattan.**
Paxson Co., J. W.
Zelnicker Supply Co., W. A.

**Brushes, Carbon.**
American Carbon & Battery Co.
General Electric Co.
Jeandron, W. J.
Morgan Crucible Co.
Westinghouse Elec. & M. Co.

**Brushes, Graphite;**
Dixon Crucible Co., Jos.

**Brush Holders.**
Anderson Mfg. Co., A. & J. M.
Eureka Co.

**Bunkers, Coal.**
American Bridge Co.

**Bushings, Case Hardened Manganese.**
Bemis Car Truck Co.

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Diamond State Fibre Co.

**Bushings, Graphite & Wooden.**
Bound Brook Oil-less Bearing Co.

**Cables. (See Wires and Cables.)**

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**Car Trimmings. (For Curtains, Doors, Seats, etc., see those Headings.)**

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Differential Car Co.

**Cars, Passengers, Freight, Express, etc.**
American Car Co.
Brill Co., The J. G.
Jewett Car Co.
Kuhlman Car Co., G. C.
St. Louis Car Co.
Stephenson Co., John.
Wason Mfg. Co.

**Cars, Second Hand.**
Electric Equipment Co.
Kerschner Co., Inc., W. R.

**Cars, Self-Propelled.**
Electric Storage Battery Co.
General Electric Co.

**Castings, Brass, Composition or Copper.**
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Columbia M. W. & M. I. Co.
Eureka Co
Frankel Connector Co.
Horne Mfg. Co.
More-Jones Brass & M. Co.

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American Bridge Co.
American Steel Foundries.
Bemis Car Truck Co.
Columbia M. W. & M. I. Co.
Horne Mfg. Co.
Long Co., E. G.
St. Louis Car Co.
Standard Steel Works Co.
Union Spring & Mfg. Co.

**Castings, Malleable and Brass.**
American Brake S. & Fdry. Co.
Bemis Car Truck Co.
Columbia M. W. & M. I. Co.
Horne Mfg. Co.
Long Co., E. G.
St. Louis Car Co.

**Catchers and Retrievers, Trolley.**
Electric Service Supplies Co.
Holden & White, Inc.
Horne Mfg. Co.
Kerschner Co., Inc., W. R.
Long Co., E. G.
Ohio Brass Co.
Trolley Supply Co.
Wood Co., C. N.

**Ceiling, Car.**
Pantasote Co., The.

**Checks, Employees.**
American Railway Supply Co.

**Chemists.**
Little, Inc., Arthur D.

**Circuit Breakers.**
Cutter Electrical & Mfg. Co.
General Electric Co.
Westinghouse Elec. & M. Co.

**Clamps and Connectors, for Wires and Cables.**
Anderson Mfg. Co., A. & J. M.
Electric Service Supplies Co.
Frankel Connector Co.
General Electric Co.
Hubbard & Co.
Klein & Sons, M.
Ohio Brass Co.
Westinghouse Elec. & M. Co.

**Cleaners & Scrapers, Track (See also Snow-Plows, Sweepers and Brooms.)**
Brill Co. The, J. G.
Ohio Brass Co.

**Clusters and Sockets.**
General Electric Co.

**Coal and Ash Handling. (See Conveying and Hoisting Machinery.)**

**Coasting Recorders.**
Railway Improv. Co.

**Coil Banding and Winding Machines.**
Columbia M. W. & M. I. Co.
Electric Service Supplies Co.

**Coils, Armature and Field.**
Cleveland Armature Works.
Coil Mfg. & Repair Co.
Columbia M. W. & M. I. Co.
D & W Fuse Co.
General Electric Co.
Independent Lamp & Wire Co.
Westinghouse Elec. & M. Co.

**Coils, Choke and Kicking.**
Electric Service Supplies Co.
General Electric Co.
Westinghouse Elec. & M. Co.

**Coin-Counting Machines.**
Electric Service Supplies Co.
International Register Co.
Johnson Fare Box Co.

**Commutator Slotters.**
Electric Service Supplies Co.
General Electric Co.
Westinghouse Elec. & M. Co.
Wood Co., C. N.

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Coil Mfg. & Repair Co.
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General Electric Co.
Long Co., E. G.
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Columbia M. W. & M. I. Co.
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General Electric Co.
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Kerschner Co., Inc., W. R.
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Electric Service Supplies Co.
International Register Co., The.
Long Co., E. G.
Roebling's Sons Co., John A.
Samson Cordage Works.
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International Steel Tie Co.

**Crossing Signals. (See Signals, Crossing.)**

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American Rolling Mill Co.
Bark River B. & Culvert Co.
California Cor. Culvert Co.
Canada Ingot & Iron Co., Ltd.
Canton Culvert & Silo Co.
Coast Culvert & Flume Co.
Corrugated Culvert Co.
Delaware Metal Culvert Co.
Dixie Culvert & Metal Co.
Hardesty Mfg. Co., R.
Illinois Corrugated Metal Co.
Independence Culvert Co.
Iowa Pure Iron Culvert Co.
Kentucky Culvert Mfg. Co.
Lee-Arnett Co.
Lone Star Culvert Co.
Lyle Corrugated Culvert Co
Michigan Bridge & Pipe Co.
Montana Culvert Co.
Nebraska Culvert & Mfg. Co.
Nevada Metal Mfg. Co.
New England Metal Cul. Co.
North East Metal Co.
Northwestern Sheet & I. Wks.
O'Neall Co., W. Q.
Ohio Corrugated Culvert Co.
Pennsylvania Metal Cul. Co.
Road Supply & Metal Co.

**Standing the Overload**

What's the usual result of an overload on your car motors or compressors?

A puff of smoke—followed by a trip to the repair shop. You can eliminate these trips by using

**Salamander Fireproof Wire**

motor field, armature and compressor coils. You can't burn out Salamander Wire Coils. We've had them red-hot on test without any breakdown.

*Send for samples and catalogs.*

**Independent Lamp & Wire Co., Inc.**

**Offices:** 1737 Broadway, New York
**FACTORIES:** York, Pa., and Weehawken, N. J.

**The "Hycap-Exide" Battery**
for
**STORAGE BATTERY STREET CARS**
**THE ELECTRIC STORAGE BATTERY CO**
PHILADELPHIA

**HORNE RAILWAY DEVICES**

Horne Double Acting Brakes
Giant Geared Brakes
Differential Staffless Brakes
Sterling Safety Brakes
Sterling Trolley Bases
Sterling Sand Boxes
Air Rectifiers, eliminating frozen air brake piping
Q-P Trolley Catchers

Lord Screenless Air Cleaners for Compressors
Hydrogrounds and Lightning Arresters
Fenders and Wheelguards
Controller Fingers
Friction and Rubber Tape
Packing and Gaskets
Air Hose and Rubber Specialties

**HORNE MANUFACTURING CO., 50 Court St., Brooklyn, N. Y.**

**UNION SPRING & MFG. CO.**
**SPRINGS**
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**M. C. B. Pressed Steel Journal Box Lids**
General Office: First Nat'l Bank Bldg.
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Works: New Kensington, Pa.
50 Church St., New York. 1204 Fisher Bldg., Chicago, Ill.
Missouri Trust Bldg., St. Louis, Mo.

**VAN DORN COUPLERS**

are made for every condition and requirement. M. C. B. Pin and Link, Car and Air, in all sizes and types.

**VAN DORN COUPLER CO.**
2325 So. Pauling St., Chicago, Ill.

**Study the Instrument Question**

Only when you have studied it by direct comparisons will you realize fully what a high degree of efficiency and economy you can effect by selecting

**Weston**

**Indicating Instruments**

As soon as you inspect them—even before you subject them to the test of comparison in actual use—the reasons for their acknowledged superiority will be apparent to you. These reasons are revealed in every structural detail.

**Weston Electrical Instrument Co.**
21 Weston Ave., Newark, N. J.
23 Branch Offices in the Larger Cities

Model 1
D. C. Portable
Voltmeter

Write for particulars regarding Weston models designed for any field of Indicating Electrical Measurement that interests you.

**National Railway Appliance Company**

50 East 42d St., NEW YORK CITY
Chicago Washington, D. C.

**RAILWAY SUPPLIES**

***SELLING AGENTS FOR***

Tool Steel Gears and Pinions
Johnson Fare Box
Perry Side Bearings
Hartman Centering Center Plates
Wasson Trolley Bases
Garland Ventilator
Electric Arc Welders
High Class Railway Varnishes and Enamels
Elastic Car Waste

Special Agents for
Tool Steel Gear & Pinion Co.
Johnson Fare Box Co.
C. & C. Electric & Mfg. Co.
Holden & White

General Agents for Anglo-American Varnish Co.
Eastern Agents for Union Fibre Co.

Sioux Falls Metal. Cul. Co.
Spokane Corr. Cul. Co.
Tennessee Metal Culvert Co.
Utah Corr. Cul. & Flume Co.
Virginia Metal & Culvert Co.
Western Metal Mfg. Co.
Wyatt Mfg. Co.

**Curtains and Curtain Fixtures.**
Brill Co., The J. G.
Du Pont Fabrikoid Co.
Edwards Co. Inc., The O. M.
Electric Service Supplies Co.
Hartshorn Company, Stewart.
Pantasote Co., The.
St. Louis Car Co.

**Cutting Apparatus, Oxy-Acetylene.**
Oxweld Acetylene Co.

**Derailing Devices.**
Cleveland Frog & Crossing Co.

**Destination Signs.**
Columbia M. W. & M. I. Co.
Creaghead Engrg. Co.
Electric Service Supplies Co.

**Detective Service.**
Wisch Service, P. Edward.

**Dispatching Systems.**
Simmen Auto. Ry. Sig. Co.

**Door Operating Devices.**
Consolidated Car-Heating Co.
National Pneumatic Co.
Safety Car Devices Co.

**Doors and Door Fixtures.**
Brill Co., The J. G.
Edwards Co., Inc., The O. M.
Hale & Kilburn Co.

**Doors, Folding Vestibule.**
National Pneumatic Co.

**Doors, Steel Rolling.**
Kinnear Mfg. Co.

**Doors, Trap.**
Edwards Co., The O. M.

**Draft Rigging. (See Couplers, Car.)**

**Drills, Track.**
American Steel & Wire Co.
Electric Service Supplies Co.
Long Co., E. G.
Niles-Bement-Pond Co.
Ohio Brass Co.

**Dryers, Sand.**
Electric Service Supplies Co.
Zelnicker Supply Co., W. A.

**Engineers, Consulting, Contracting and Operating.**
Archbold-Brady Co.
Arnold Co., The.
Beeler, John A.
Burch, Edw. P.
Byllesby & Co., H. M.
Ford, Bacon & Davis.
Hunt & Co., Robert W.
Jackson, D. C. & Wm. B.
Little, Inc., Arthur D.
Neiler, Rich & Co.
Richey, Albert S.
Sanderson & Porter.
Sargent & Lundy.
Scofield Engineering Co.
Stephenson Sons & Co., S.
Stone & Webster Eng'g Corp.
White Companies, The J. G.
Woodmansee & Davidson, Inc.

**Engines, Gas and Oil.**
Westinghouse Elec. & M. Co.

**Engines, Steam.**
Westinghouse Elec. & M. Co.

**Extension Platform Trap Doors.**
Edwards Co., Inc., The O. M.

**Fare Boxes.**
Brill Co., The J. G.
Cleveland Fare Box Co.
International Register Co., The.
Johnson Fare Box Co.
Ohmer Fare Register Co.

**Fences, Woven Wire and Fence Posts.**
American Steel & Wire Co.
Page Woven Wire Fence Co.

**Fenders and Wheel Guards.**
Brill Co., The J. G.
Cleveland Fare Box Co.
Consolidated Car Fender Co.
Electric Service Supplies Co.
Horne Mfg. Co.
Star Brass Works.
Trolley Supply Co.

**Fibre and Fibre Tubing.**
Diamond State Fibre Co.
Westinghouse Elec. & M. Co.

**Fibre Insulation.**
National Ry. Appliance Co.

**Field Coils. (See Coils.)**

**Filters, Water.**
Scaife & Sons Co., Wm. B.

**Floodlights**
Crouse-Hinds Co.

**Flooring, Composition.**
American Mason Safety T. Co.

# WHAT AND WHERE TO BUY

**Forgings.**
Columbia M. W. & M. I. Co.
Eureka Co.
Standard Steel Works Co.

**Furniture, Metal Office.**
Edwards Co., Inc., The O. M.

**Fuses and Fuse Boxes.**
Chicago Fuse Mfg. Co.
Columbia M. W. & M. I. Co.
D & W Fuse Co.
Daum, A. F.
General Electric Co.
Westinghouse Elec. & M. Co.

**Fuses, Refillable.**
Columbia M. W. & M. I. Co.
Economy Fuse & Mfg. Co.
General Electric Co.
Horne Mfg. Co.

**Gages, Oil and Water.**
Ohio Brass Co.

**Gaskets.**
Diamond State Fibre Co.
Power Specialty Co.

**Gas-Electric Cars.**
General Electric Co.

**Gas Producers.**
Westinghouse Elec. & M. Co.

**Gates, Car.**
Brill Co., The J. G.
Jewett Car Co.

**Gear Blanks.**
Carnegie Steel Co.
Diamond State Fibre Co.
Standard Steel Wks. Co.

**Gear Cases.**
Columbia M. W. & M. I. Co.
Electric Service Supplies Co.
Kerschner Co. Inc., W. R.
National Ry. Appliance Co.
Westinghouse Elec. & M. Co.

**Gears and Pinions.**
Bemis Car Truck Co.
Columbia M. W. & M. I. Co.
Diamond State Fibre Co.
Electric Service Supplies Co.
General Electric Co.
Kerschner Co., Inc., W. R.
Long Co., E. G.
National Ry. Appliance Co.
Nuttall Co., R. D.

**Generating Sets, Gas-Electric.**
General Electric Co.

**Generators.**
Dick, Kerr & Co.
General Electric Co.
Westinghouse Elec. & M. Co.

**Gongs. (See Bells and Gongs.)**

**Graphite.**
Dixon Crucible Co., Joseph.
Morgan Crucible Co.

**Grates, Chain.**
Green Eng'g Co.

**Greases. (See Lubricants.)**

**Grinders and Grinding Supplies.**
General Electric Co.
Goldschmidt Thermit Co.
Indianapolis Switch & Frog Co.
Railway Track-work Co.

**Grinding Blocks & Wheels.**
Norton Co.

**Guards, Cattle.**
American Bridge Co.

**Guards, Trolley.**
Electric Service Supplies Co.
Ohio Brass Co.

**Harps, Trolley.**
Anderson M. Co., A. & J. M.
Bayonet Trolley Harp Co.
Electric Service Supplies Co.
Hensley Trolley & Mfg. Co.
More-Jones Brass & M. Co
Nuttall Co., R. D.
Star Brass Works.

**Headlights.**
Crouse-Hinds Co.
Electric Service Supplies Co.
General Electric Co.
Long Co., E. G.
Ohio Brass Co.
St. Louis Car Co.
Trolley Supply Co.
Westinghouse Elec. & M. Co.

**Headlinings.**
Kerschner Co., Inc., W R.
Pantasote Co., The.

**Heaters, Car, Electric.**
Consolidated Car-Heating Co.
Gold Car Heating & Lighting Co.
Smith Heater Co., Peter.

**Heaters, Car, Hot Air and Water.**
Cooper Heater Co.
Smith Heater Co., Peter.

**Heaters, Car, Stove.**
Electric Service Supplies Co.
Smith Heater Co., Peter.

**Hoists and Lifts.**
Columbia M. W. & M. I. Co.
Duff Manufacturing Co.
Ford Chain Block & Mfg. Co.
Niles-Bement-Pond Co.

**Hose Bridges.**
Ohio Brass Co.

**Hydraulic Machinery.**
Niles-Bement-Pond Co.
Watson-Stillman Co.

**Hydrogrounds.**
Horne Mfg. Co.

**Inspection.**
Elec'l Testing Laboratories.
Hunt & Co., Robert W.

**Instruments, Measuring, Testing and Recording.**
General Electric Co.
Sangamo Electric Co.
Westinghouse Elec. & M. Co.
Weston Elec'l Instrument Co.

**Insulating Cloths, Paper and Tape.**
Anchor Webbing Co.
Diamond State Fibre Co.
General Electric Co.
Hope Webbing Co.
Mechanical Rubber Co.
Mica Insulator Co.
Okonite Co.
Standard Underground Cable Co.
Standard Woven Fabric Co.
Westinghouse Elec. & M. Co.

**Insulation. (See also Paints.)**
Anderson M. Co., A. & J. M.
Diamond State Fibre Co.
Electric Service Supplies Co.
General Electric Co.
Holden & White Inc.
Mechanical Rubber Co.
Okonite Co.
Westinghouse Elec. & M. Co.

**Insulators. (See also Line Material.)**
Anderson M. Co., A. & J. M.
Creaghead Engrg. Co.
Drew Elec. & Mfg. Co.
Electric Ry. Equipment Co.
Electric Service Supplies Co.
General Electric Co.
Macallen Co.
Ohio Brass Co.
Westinghouse Elec. & M. Co.
White Elec. Supply Co., T. C.

**Insulator Pins.**
Hubbard & Co.

**Insurance, Fire.**
Marsh & McLennan.

**Inventions, Developed and Perfected.**
Peters & Co., G. D.

**Jacks. (See also Cranes, Hoists and Lifts.)**
Brill Co., The J. G.
Buckeye Jack Mfg. Co.
Columbia M. W. & M. I. Co.
Duff Manufacturing Co.
National Ry. Appliance Co.
Watson-Stillman Co.

**Joints, Rail.**
Atlantic Welding Co.
Carnegie Steel Co.
Rail Joint Co., The.
Zelnicker Supply Co., W. A.

**Journal Boxes.**
Bemis Car Truck Co.
Brill Co., The J. G.
Gurney Ball Bearing Co.
Long Co., E G.
Railway Roller Bearing Co.

**Junction Boxes.**
Standard Underground Cable Co.

**Laboratories.**
Elec'l Testing Laboratories.
Little, Inc., Arthur D.

**Lamp Guards and Fixtures.**
Anderson M. Co., A. & J. M.
Electric Service Supplies Co.
General Electric Co.
Westinghouse Elec. & M. Co.

**Lamps, Arc and Incandescent.**
Anderson M. Co., A. & J. M.
General Electric Co.
Westinghouse Elec. & M. Co.

**Lamps, Signal and Marker.**
Ohio Brass Co.

**Lathes, Car Wheel.**
Niles-Bement-Pond Co.

**Lighting Regulators, Car.**
Holden & White, Inc.

**Lightning Protection.**
Anderson M. Co., A. & J. M.
Electric Service Supplies Co.
General Electric Co.
Horne Mfg. Co.
Ohio Brass Co.
Westinghouse Elec. & M. Co.

**Line Material. (See also Brackets, Insulators, Wires, etc.)**
Anderson M. Co., A. & J. M.
Archbold-Brady Co.
Columbia M. W. & M. I. Co.
Creaghead Engrg. Co.
Diamond State Fibre Co.
Dick, Kerr & Co.
Drew Elec. & Mfg. Co.
Electric Ry. Equipment Co.
Electric Service Supplies Co.
Eureka Co.
General Electric Co.
Holden & White, Inc.
Hubbard & Co.
Macallen Co.
More-Jones Brass & M. Co.
Ohio Brass Co.
Westinghouse Elec. & M. Co.
White Elec. Supply Co., T. C.

**Lockers, Metal.**
Edwards Co., Inc., The O. M.

**Locomotives, Electric.**
Baldwin Locomotive Works.
Brill Co., The J. G.
General Electric Co.
Westinghouse Elec. & M. Co.

**Lubricants, Oil and Grease.**
Borne, Scrymser Co.
Dearborn Chemical Co.
Dixon Crucible Co., Jos.

**Lumber. (See Poles, Ties, Posts, etc.)**

**Machine Work.**
Columbia M. W. & M. I. Co.
Horne Mfg. Co.

**Machine Tools.**
Columbia M. W. & M. I. Co.
Niles-Bement-Pond Co.
Watson-Stillman Co.

**Manganese Parts.**
Bemis Car Truck Co.

**Meters, Car, Watthour.**
Sangamo Electric Co.

**Meters. (See Instruments.)**

**Mica.**
Drew Elec. & Mfg. Co.
Long Co., E. G.
Macallen Co.

**Motormen's Seats.**
Electric Service Supplies Co.
Wood Co., C. N.

**Motor Generator, Bonding and Welding.**
Lincoln Bonding Co.

**Motors and Generators Sets.**
General Electric Co.

**Motors, Electric.**
Dick, Kerr & Co.
General Electric Co.
Westinghouse Elec. & M. Co.

**Nuts and Bolts.**
Bemis Car Truck Co.
Columbia M. W. & M. I. Co.
Hubbard & Co.
Long Co., E. G.
National Ry. Appliance Co.
Roller Lock Nut Co.

**Oils. (See Lubricants.)**

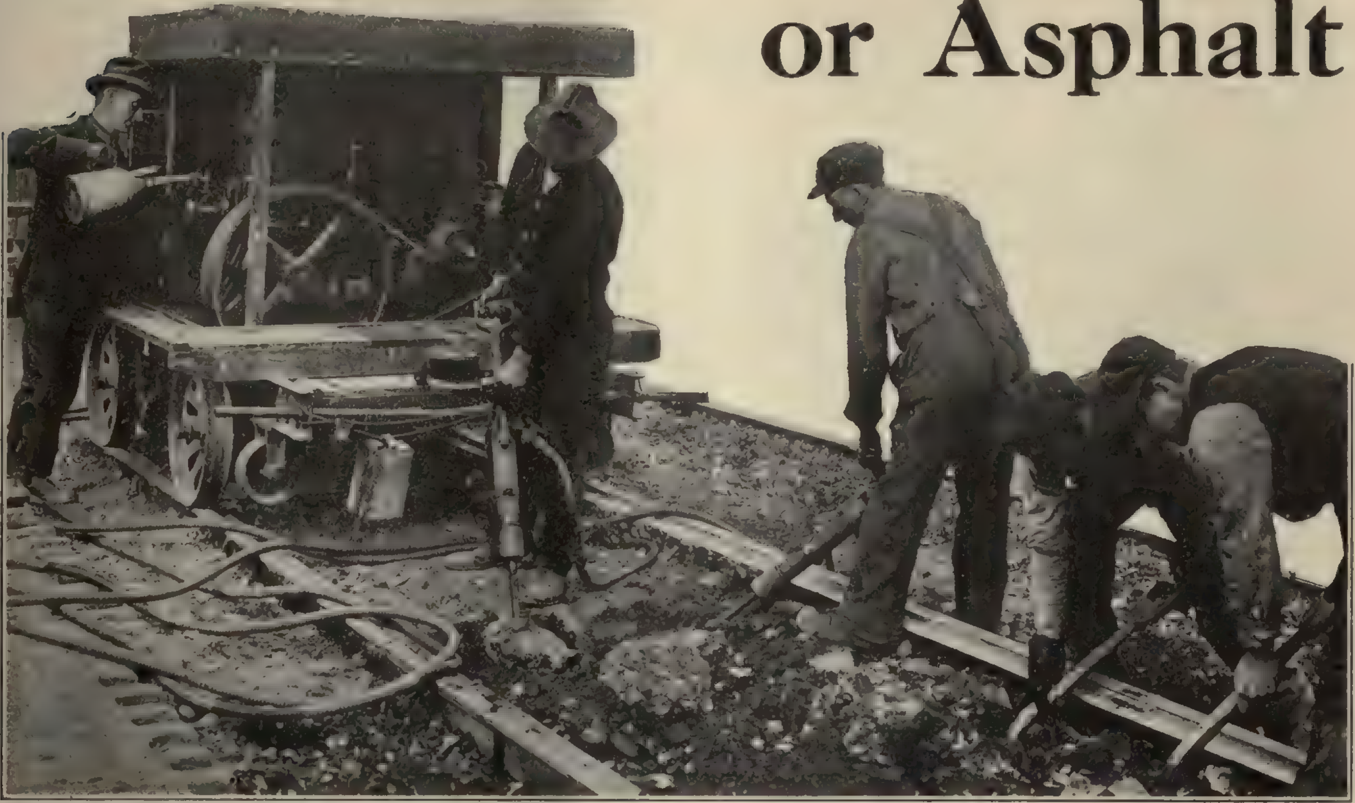
**Overhead Equipment. (See Line Material.)**

**Oxy-Acetylene. (See Cutting Apparatus, Oxy-Acetylene.)**

**Packing.**
Diamond State Fibre Co.
Electric Service Supplies Co.
Horne Mfg. Co.
Mechanical Rubber Co.
Power Specialty Co.

**Paints and Varnishes. (Insulating.)**
General Electric Co.
Holden & White, Inc.
Long Co., E. G.
Mica Insulator Co.

# The Removal of Concrete or Asphalt



Breaking Up Concrete Using "Imperial" Tie Tampers and an "Imperial" Portable Compressor, Albany, N. Y.

Can be accomplished with greater speed and at less cost than hand work by the use of

# "IMPERIAL" TIE TAMPERS

For cutting concrete a pointed pick is substituted for the tamping bar. The pneumatic pick rapidly breaks up the concrete in chunks convenient for loading.

For cutting asphalt a sharp chisel cutter is used—first to groove the pavement and then to cut and pry it up in slabs.

To quote Mr. Fred. H. Hill, Gen'l Manager of the Elmira (N. Y.) Water, Light and Railroad Co., who speaks from his experience:

"An idea of the cutting speed of the tools can be gained from an observation made while the four tools were in operation, making the outer break in the asphalt. In an hour and a half a 282 ft. cut was made, which is equivalent to 47 ft. per hour per tool.

"The use of the pneumatic concrete picks was relatively a greater saver of time and labor than for cutting asphalt."

THE SAME TOOLS WILL TAMP YOUR TRACK FASTER, BETTER AND REDUCE TAMPING COSTS.

Ask for Bulletin 9023

Cutting Asphalt Pavement at Elmira, N. Y.

**INGERSOLL-RAND COMPANY**

11 Broadway, New York 65-TT 165 Q. Victoria St., London

# WHAT AND WHERE TO BUY

**Paints and Varnishes. (Preservative.)**
Dixon Crucible Co., Jos.
Long Co., E. G.
National Ry. Appliance Co.

**Paints and Varnishes for Woodwork.**
National Railway Appliance Co.

**Paving Brick. (Filler and Stretcher.)**
Nelsonville Brick Co.

**Paving Material.**
American B. S. & Fdy. Co.
Nelsonville Brick Co.

**Pickups. (Trolley Wire.)**
Electric Service Supplies Co.
Ohio Brass Co.

**Pinion Pullers.**
Columbia M. W. & M. I. Co.
Electric Service Supplies Co.
General Electric Co.
Wood Co., C. N.

**Pinions. (See Gears.)**

**Pins, Case Hardened, Wood and Iron.**
Bemis Car Truck Co.
Electric Service Supplies Co.
Long Co., E. G.
Ohio Brass Co.

**Pipe.**
National Tube Co.

**Pipe Fittings.**
National Tube Co.
Power Specialty Co.
Standard Steel Works Co.
Watson-Stillman Co.

**Poles, Metal Street.**
Bates Expanded Steel Truss Co.
Electric Ry. Equipment Co.
Hubbard & Co.
National Railway Appliance Co.
National Tube Co.

**Pole Sleeves.**
Drew Elec. & Mfg. Co.

**Poles, Ties, Posts, Piling and Lumber.**
Carney & Co., B. J.
Lindsley Bros. Co.
Page & Hill Co.
Valentine-Clark Co.

**Poles and Ties, Treated.**
Lindsley Bros. Co.
Page & Hill Co.
Valentine-Clark Co.

**Poles, Trolley.**
Anderson M. Co., A. & J. M.
Bayonet Trolley Harp Co.
Columbia M. W. & M. I. Co.
Electric Service Supplies Co.
Long Co., E. G.
National Tube Co.
Nuttall Co., R. D.

**Pole Reinforcing.**
Hubbard & Co.

**Potheads.**
Okonite Co.

**Power Saving Devices.**
Arthur Power-Saving Recorder Co.

**Pressure Regulators.**
General Electric Co.
Ohio Brass Co.

**Pumps.**
Watson-Stillman Co.

**Punches, Ticket.**
American Railway Supply Co.
Bonney-Vehslage Tool Co.
International Register Co., The.
Wood Co., C. N.
Woodman Mfg. & Supply Co., R.

**Punching Machinery.**
Watson-Stillman Co.

**Purifiers, Feed Water.**
Scaife & Sons Co., Wm. B.

**Rail Grinders. (See Grinders.)**

**Rails, Relaying.**
Zelnicker Supply Co., W. A.

**Rail Welding. (See Welding Processes and Apparatus.)**

**Rattan.**
Brill Co., The J. G.
Electric Service Supplies Co.
Hale & Kilburn Co.
Jewett Car Co.
St. Louis Car Co.

**Recorders, Power Saving.**
Arthur Power-Saving Recorder Co.

**Registers and Fittings.**
Bonham Recorder Co.
Brill Co., The J. G.
Electric Service Supplies Co.
International Register Co., The.
Long Co., E. G.
Ohmer Fare Register Co.
Rooke Automatic Register Co.

**Reinforcing Concrete.**
American Steel & Wire Co.

**Repair Shop Appliances. (See also Coil Banding and Winding Machines.)**
Columbia M. W. & M. I. Co.
Electric Service Supplies Co.

**Repair Work. (See also Coils, Armature and Field.)**
Cleveland Armature Works.
Coil Mfg. & Repair Co.
Columbia M. W. & M. I. Co.
General Electric Co.
Independent Lamp & W. Co.
Westinghouse Elec. & M. Co.

**Replacers, Car.**
Columbia M. W. & M. I. Co.
Electric Service Supplies Co.

**Resistance, Grid.**
Columbia M. W. & M. I. Co.
Ellcon Co.

**Resistance, Wire and Tube.**
General Electric Co.
Westinghouse Elec. & M. Co.

**Retrievers, Trolley. (See Catchers and Retrievers, Trolley.)**

**Rheostats.**
Ellcon Co.
General Electric Co.
Mica Insulator Co.
Westinghouse Elec. & M. Co.

**Roofing, Car.**
Pantasote Co., The.

**Rubber Specialties of all Kinds.**
Mechanical Rubber Co.

**Sand Blasts.**
National Ry. Appliance Co.

**Sanders, Track.**
Brill Co., The J. G.
Cleveland Fare Box Co.
Columbia M. W. & M. I. Co.
Electric Service Supplies Co.
Holden & White, Inc.
Horne Mfg. Co.
Jewett Car Co.
Ohio Brass Co.
St. Louis Car Co.

**Sash Balances.**
Edwards Co., Inc., The O. M.

**Sash Fixtures, Car.**
Brill Co., The J. G
Edwards Co., Inc., The O. M.

**Sash, Metal, Car Windows.**
Edwards Co., Inc., The O. M.
Hale & Kilburn Co.

**Scales, Weights, Balances and Dynamometers.**
Horne Mfg. Co.

**Seating Material. (See also Rattan.)**
Brill Co., The J. G.
Du Pont Fabrikoid Co.
Pantasote Co., The.

**Seats, Car.**
Brill Co., The J. G.
Hale & Kilburn Co.
Jewett Car Co.
Peters & Co., G. D.
St. Louis Car Co.

**Second-Hand Equipment. (See also pages 82, 83.)**
Archer & Baldwin.
Kerschner Co., Inc., W. R.
MacGovern & Co.

**Shade Rollers.**
Hartshorn Co., Stewart.

**Shades, Vestibule.**
Brill Co., The J. G.
Electric Service Supplies Co.

**Shovels.**
Hubbard & Co.

**Signals, Car Starting.**
Consolidated Car-Heating Co.
National Pneumatic Co.

**Signals, Highway Crossing.**
Electric Service Supplies Co.
Simmen Auto. Ry. Signal Co.
U. S. Electric Signal Co.

**Signal Systems, Block.**
Electric Service Supplies Co.
Federal Signal Co.
Simmen Auto Ry. Signal Co.
Union Switch & Signal Co.
U. S. Electric Signal Co.
Wood Co., C. N.

**Slack Adjusters. (See Brake Adjusters.)**

**Sleet Wheels and Cutters.**
Anderson M. Co., A. & J. M.
Bayonet Trolley Harp Co.
Bonney-Vehslage Tool Co.
Columbia M. W. & M. I. Co.
Drew Elec. & Mfg. Co.
Holden & White, Inc.
More-Jones Brass & M., Co.
Nuttall Co., R. D.

**Snow-Plows, Removers, Sweepers, etc.**
Brill Co., The J. G.
Columbia M. W. & M. I. Co.
Consolidated Car Fender Co.

**Soldering and Brazing Apparatus. (See Welding Proc. & App.)**

**Speed Indicators.**
Wood Co., C. N.
Woodman Mfg. & Supply Co., R.

**Spikes.**
American Steel & Wire Co.

**Splicing Compounds.**
Mechanical Rubber Co.
Standard Woven Fabric Co.
Westinghouse Elec. & M. Co.

**Splicing Sleeves. (See Clamps and Connectors.)**

**Springs, Car & Truck.**
American Steel Foundries.
American Steel & Wire Co.
Bemis Car Truck Co.
Brill Co., The J. G.
Long Co., E. G.
Standard Steel Works Co.
Taylor Elec. Truck Co.
Union Spring & Mfg. Co.

**Sprinklers, Track and Road.**
Brill Co., the J. G.
St. Louis Car Co.

**Steps, Car.**
American Mason S. T. Co.
Universal Safety Tread Co.

**Stokers, Mechanical.**
Babcock & Wilcox Co.
Green Engrg. Co.
Murphy Iron Works.
Westinghouse Elec. & M. Co.

**Storage Batteries. (See Batteries, Storage.)**

**Straps, Car, Sanitary.**
Central Equipment Co.
Holden & White, Inc.
Railway Improvement Co.

**Structural Iron. (See also Bridges.)**

**Sub-Stations.**
Delta Star Electric Co.

**Superheaters.**
Babcock & Wilcox.
Power Specialty Co.

**Sweepers, Snow. (See Snow-Plows, Sweepers and Brooms.)**

**Switchstands.**
Kilby Frog & Switch Co.
Indianapolis Switch & Frog. Co.
Ramapo Iron Works.

**Switches, Track. (See Track, Special Work.)**

**Switches and Switchboards.**
Anderson M. Co., A. & J. M.
Cutter Electrical & Mfg. Co.
Delta Star Electric Co.
Electric Service Supplies Co.
General Electric Co.
U. S. Electric Signal Co.
Westinghouse Elec. & M. Co.

**Tampers, Tie.**
Ingersoll-Rand Co.

**Tapes & Cloth. (See Insulating Cloths, Paper and Tape.)**

**Telephones and Parts.**
Electric Service Supplies Co.

**Terminals.**
Frankel Connector Co.

**Terminal Cables.**
Standard Underground Cable Co.

**Testing Clips.**
Frankel Connector Co.

**Testing, Commercial and Electrical.**
Electrical Testing Laboratories.
Hunt & Co., Robert W.

**Testing Instruments. (See Instruments, Electrical, Measuring, Testing.)**

**Thermostats.**
Consolidated Car-Heating Co.
Gold Car Heating & Lighting Co.
Railway Utility Co.
Smith Heater Co., Peter.

**Ticket Boxes.**
Macdonald Ticket & Ticket Box Co.

**Ticket Choppers and Destroyers.**
Electric Service Supplies Co.
Patten Co., Paul B.

**Tickets and Transfers.**
American Railway Supply Co.

**Ties and Tie Rods, Steel.**
American Bridge Co.
Carnegie Steel Co.
International Steel Tie Co.

**Ties, Wood. (See Poles, Ties, etc.)**

**Tools, Track and Miscellaneous.**
American Steel & Wire Co.
Columbia M. W. & M. I. Co.
Electric Service Supplies Co.
Klein & Sons, M.
Railway Track-work Co.

**Torches, Acetylene. (See Cutting Apparatus, Oxy-Acetylene.)**

**Towers and Transmission Structures.**
American Bridge Co.
Archbold-Brady Co.
Bates Expanded Steel Truss Co.
Delta Star Electric Co.
Westinghouse Elec. & M. Co.

**Tower Wagons and Auto-Trucks.**
McCardell & Co., J. R.

**Track, Special Work.**
American Frog & Switch Co.
Cleveland Frog & Crossing Co.
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on this street and other business avenues of American cities.

The cost of the new rail, big as that may be, is really a small item compared with the traffic losses incident to relaying and replacing track and pavement.

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*Using*
*Inspecting*
*Checking up Savings*

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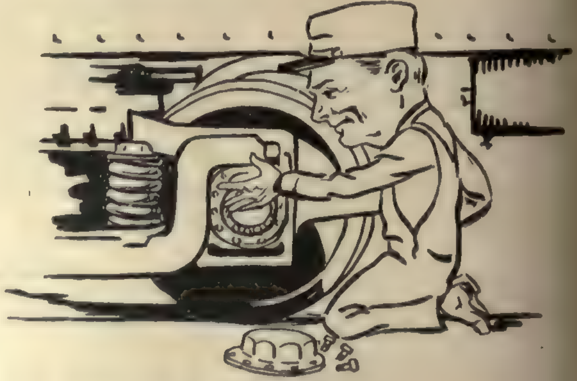
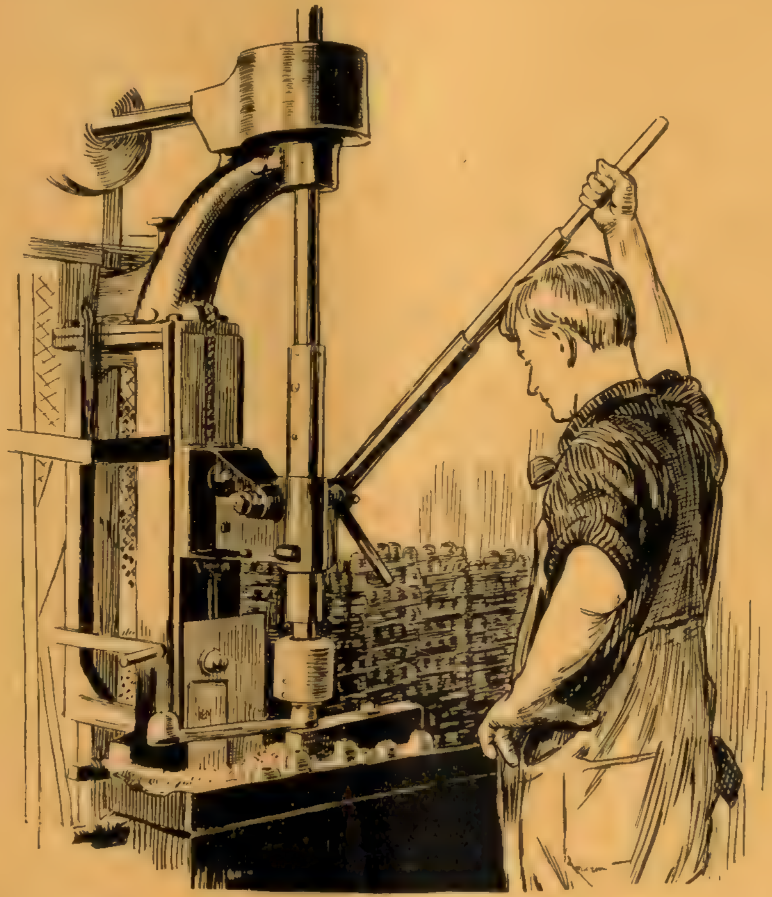


**The Railway Roller Bearing Co.**
**Syracuse, New York**



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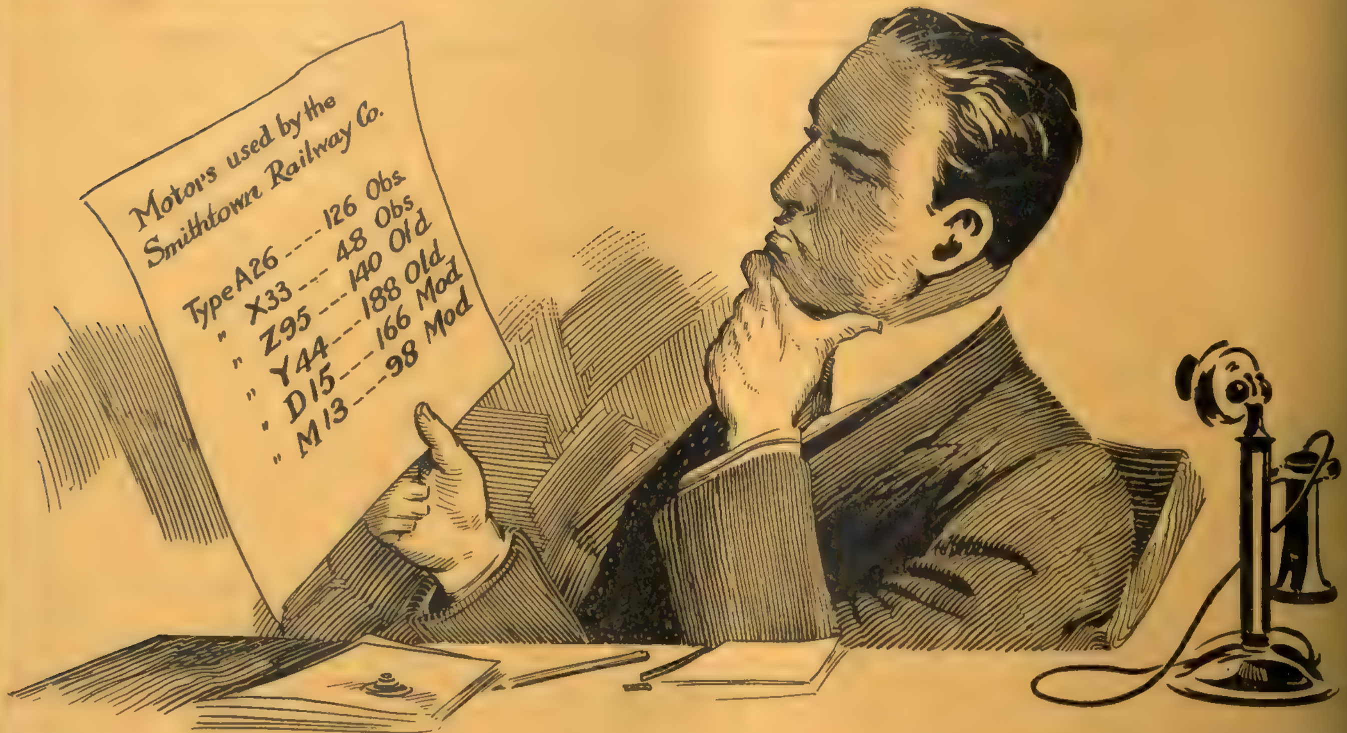

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New Detroit United Freight Terminal

# ELECTRIC RAILWAY JOURNAL

New York, August 11, 1917 McGraw-Hill Publishing Co., Inc. Vol. 50, No. 6 10c a copy

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HOUSTON, T

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H. W. BLAKE, Editor

VOLUME 50, NO. 6 NEW YORK, AUGUST 11, 1917 PAGES 213 TO 254

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A spacious new freight terminal in Detroit, including two specially-designed buildings, will materially reduce cost of handling freight besides providing accommodations for the increased volume of business to be expected with the introduction of improved facilities .........Page 219

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A new freight terminal which covers a 6-acre tract is now under construction. The freight house floor area will total 60,000 sq. ft., in addition to ample platform space and about 1½ miles of loading, storage and team tracks ............................................Page 224

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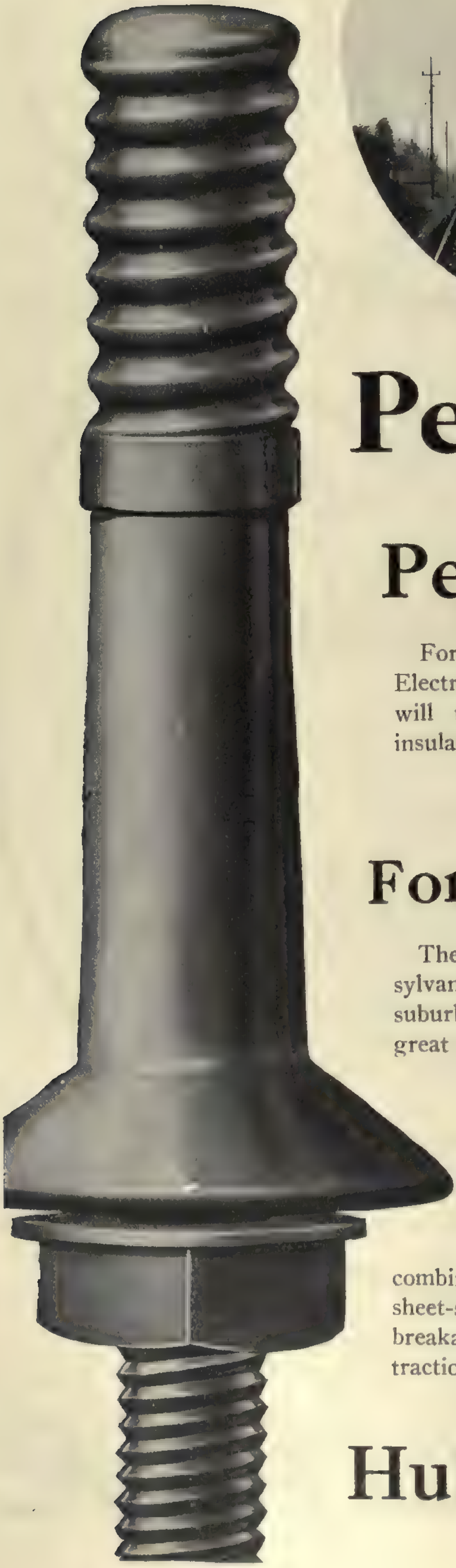
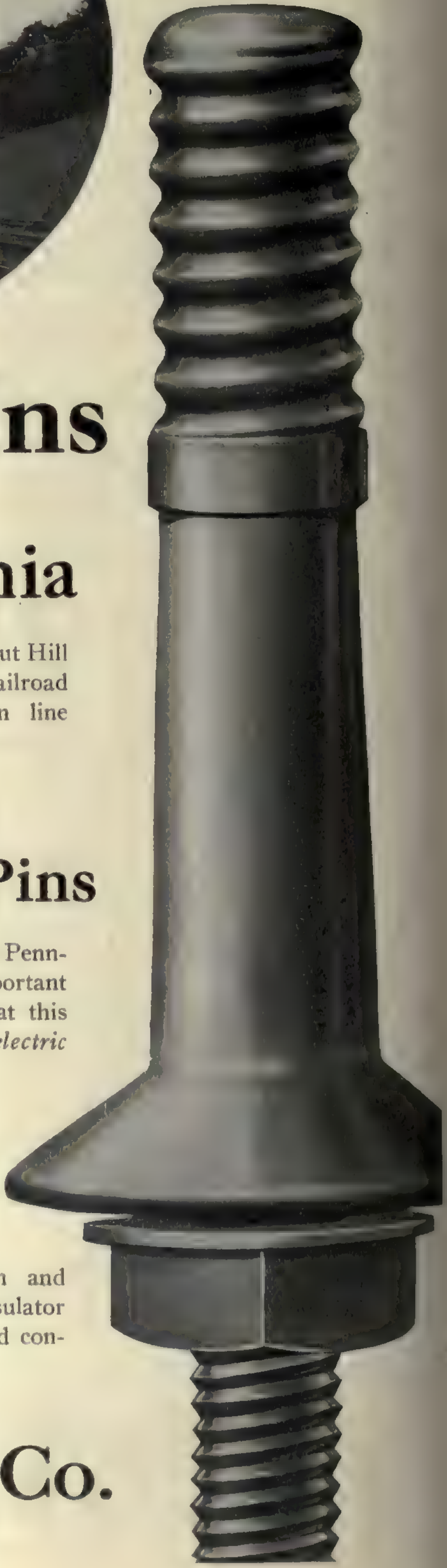
**Westinghouse**





# Peirce Pins

## on the

## Pennsylvania

For its new Germantown-Chestnut Hill Electrification the Pennsylvania Railroad will use 44,000-volt transmission line insulators fitted with

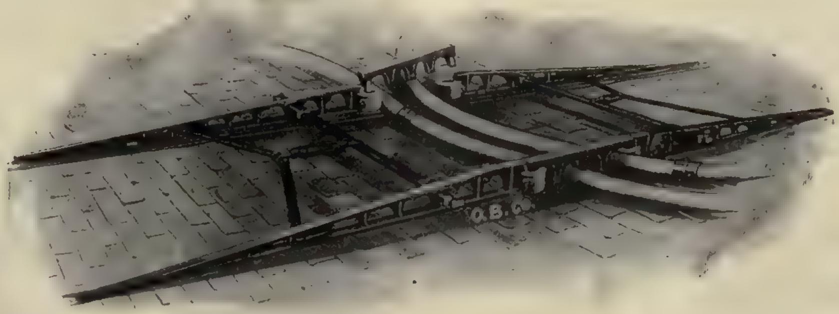
## PEIRCE
## Forged Steel Pins

The choice of Peirce Pins by the Pennsylvania Railroad for this important suburban electrification proves that this great railroad sets up for its *electric* service the high standards which have long characterized its *steam* service.

Peirce forged pins are the best insulator insurance you can buy. Their combination of forged steel pin and sheet-steel thimble eliminates insulator breakage due to the expansion and contraction of cast-iron pins.

**Hubbard & Co.**

**Pittsburgh, Pa.**



# A Remedy for Fire Blockades

When there is a fire and lines of hose are stretched across your tracks there need be no costly blockade.

## O-B Hose Bridge

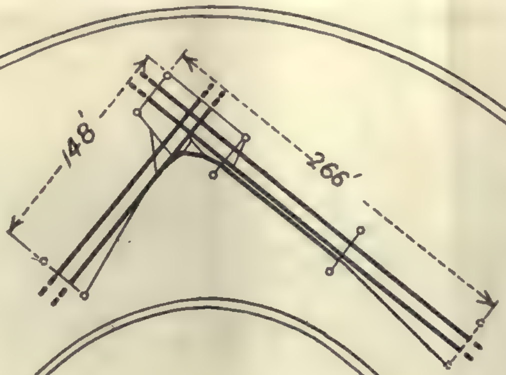
is strong enough to carry the heaviest interurban car across several lines of hose with perfect safety to both.

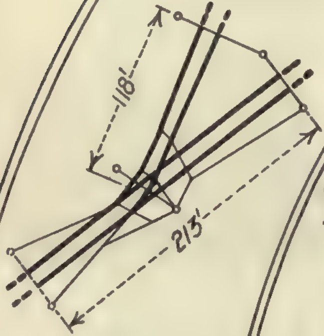
O-B Hose Bridge is strongly made of steel. It can be quickly taken apart or set up. When it is "knocked down" it occupies but little space on a trouble wagon—ready to prevent a blockade at a moment's notice.

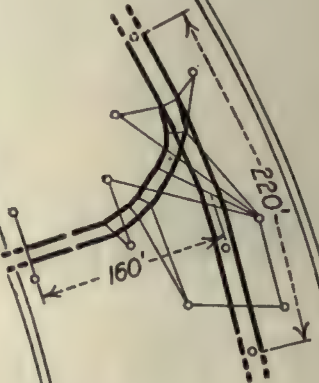
Fire chiefs universally approve of it. In one city O-B Hose Bridges are carried on the hose wagons by the Chief's order.

Described on page 547, Catalog No. 16.

**The Ohio Brass Co.**
**Mansfield, Ohio**

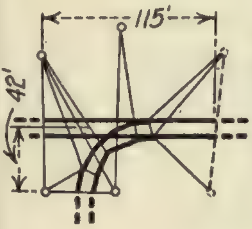


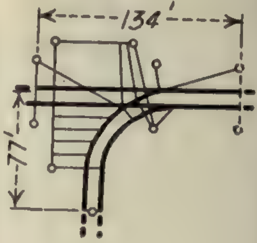


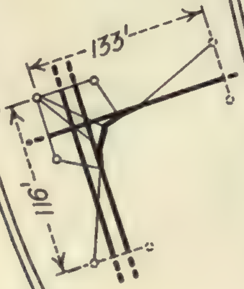


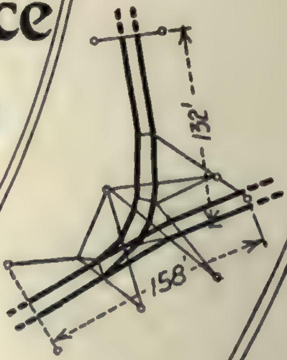
The
more complicated
your overhead
the
more reason for using
Phono-Electric
the
trolley wire *of*
uninterrupted service

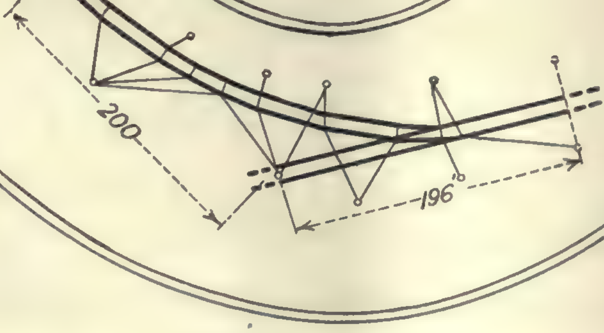
**Bridgeport Brass
Company
Bridgeport
Conn.**











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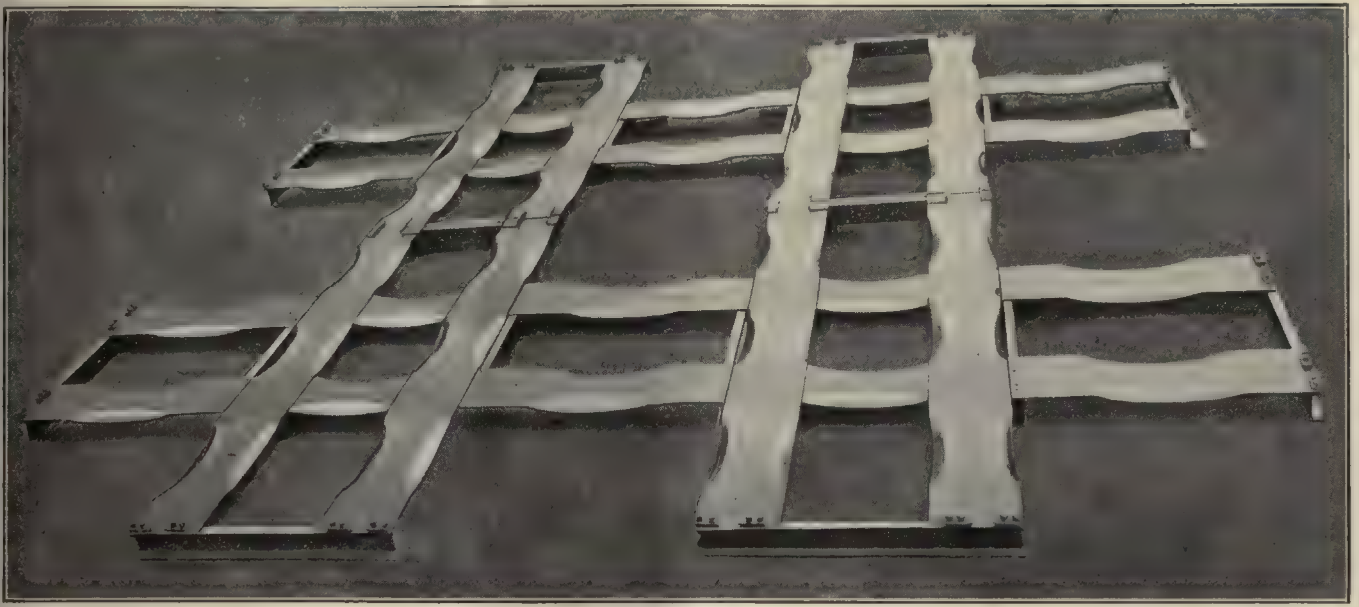


Double track installation for Denver Tramway

# STEEL at the price of WOOD

# INTERNATIONAL
## STEEL TWIN CROSSING TIES

## For
## Paved Street Track Intersections

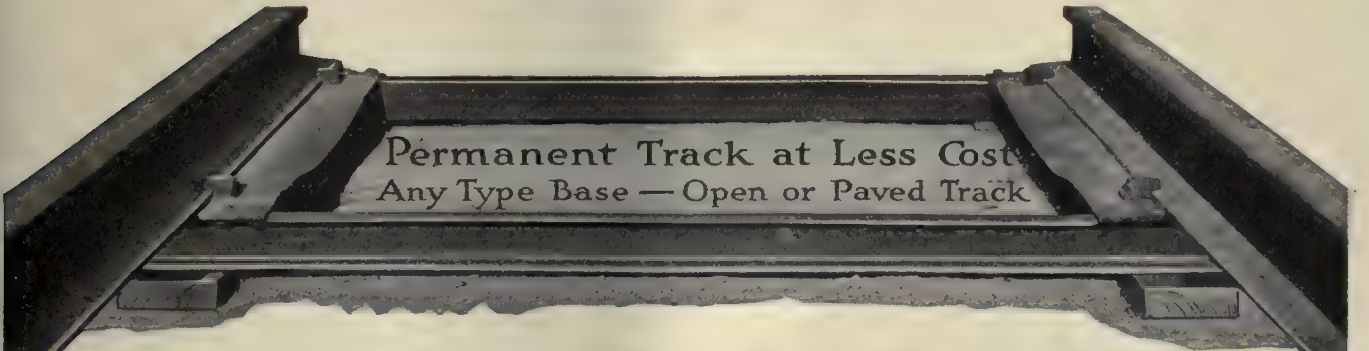
Our steel twin tie construction as a substitute for wooden ties under your crossing frogs in paved streets is SOMETHING NEW and SOMETHING BETTER.

These ties may be had at about $125.00 per right angle intersection. That's about the cost of your wooden ties. This remarkably low price is made possible by adopting the twin tie principle in building up this product. The steel twin tie principle has been proved sound. The large effective bearing area maintains line and surface. All permanent materials on a concrete foundation make for maintenance economy and long life.

Our large stock of low priced steel insures a moderate cost and quick delivery.

Let us quote you on a specific installation. One where the frogs and paving just won't "stay put."

***Prompt deliveries made from stock***


Permanent Track at Less Cost
Any Type Base — Open or Paved Track

## The International Steel Tie Company

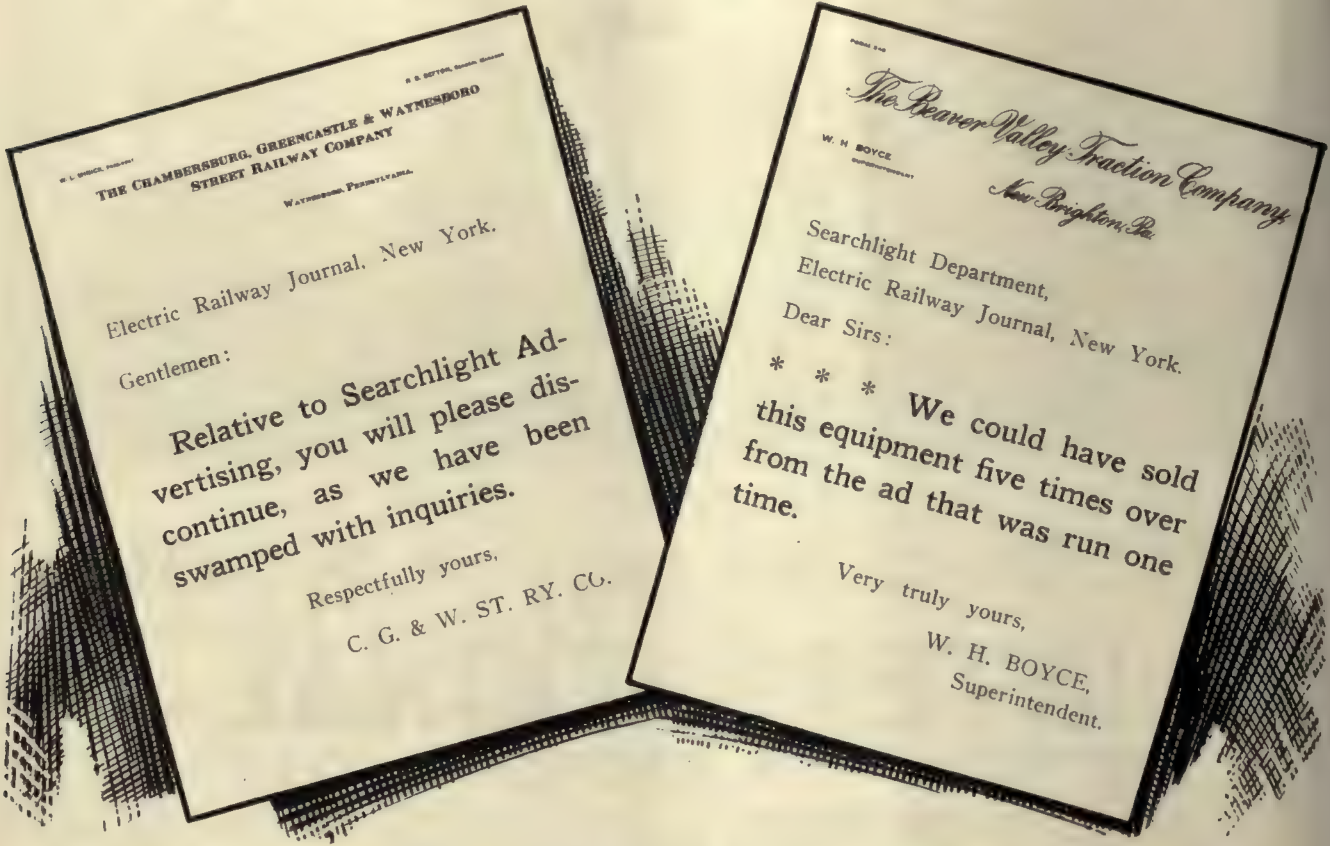
**Manufacturers of Steel Twin Ties and Crossing Foundations**

**General Sales Office and Works: Cleveland, Ohio**

REPRESENTATIVES:

Western Eng'g Sales Co., Los Angeles, Cal.
San Francisco, Cal. Seattle, Wash.
R. J. Cooper Co., Salt Lake City, Utah.
J. E. Lewis & Co., Dallas, Texas.
Maurice Joy, Philadelphia.
William H. Ziegler, Minneapolis, Minn.

# Business is Booming!



THE CHAMBERSBURG, GREENCASTLE & WAYNESBORO
STREET RAILWAY COMPANY
WAYNESBORO, PENNSYLVANIA.

Electric Railway Journal, New York.

Gentlemen:

Relative to Searchlight Advertising, you will please discontinue, as we have been swamped with inquiries.

Respectfully yours,
C. G. & W. ST. RY. CO.

---

The Beaver Valley Traction Company
New Brighton, Pa.

W. H. BOYCE

Searchlight Department,
Electric Railway Journal, New York.

Dear Sirs:

* * * We could have sold this equipment five times over from the ad that was run one time.

Very truly yours,
W. H. BOYCE,
Superintendent.

---

## *Are you getting your share?*

Second-hand equipment is commanding a premium. Look over your stock and convert it into cash. Send us the list.

# Searchlight

advertising
will find the anxious buyer for you.

*SEND US YOUR LIST*

**Electric Railway Journal, 239 West 39th Street, New York**

Pinion Pulling Machine
Type M

Armature Winding Stand
Type C

Use These to Speed-Up Your Armature Repairs

Armature Truck
Type F

Peerless Car Barn Appliances and Tools offer the very best means of speeding up your Armature and various other repairs. Each tool or appliance is designed for its special work, and from our catalog you can select from various types of each just the ones to meet your requirements.

Illustrations show typical Peerless shop equipment and demonstrate how strongly and accurately they are made, each tool or appliance having many features embodied only in the Peerless line.

*Write for Special Catalog*

**ELECTRIC SERVICE SUPPLIES CO.**

*Manufacturer of Railway Material and Electrical Supplies*

PHILADELPHIA
17th and Cambria Sts.

NEW YORK
50 Church St.

CHICAGO
Monadnock Bldg.

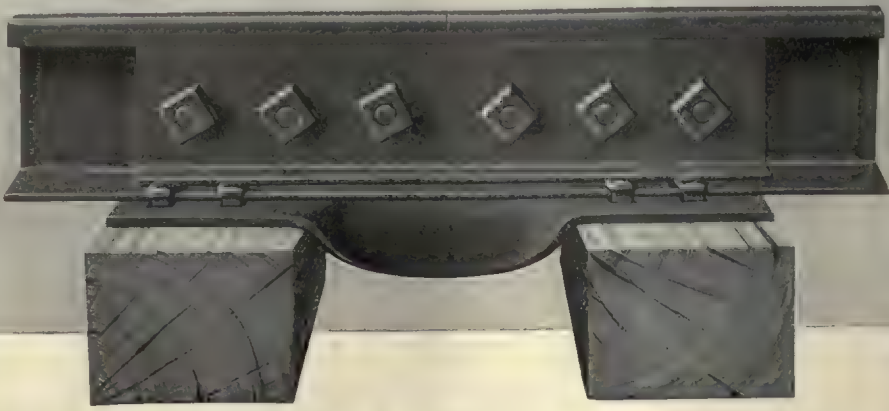
Canadian Distributors: Lyman Tube & Supply Co., Ltd., Montreal, Toronto

# Flat-ended ABBOTT RAIL-JOINT PLATES

The ABBOTT RAIL JOINT PLATE
"BUILT LIKE A BRIDGE"

**offer the best solution for the joint problem with high T or girder rails in paved streets**

The ABBOTT RAIL JOINT PLATE
"BUILT LIKE A BRIDGE"



THE flat-end pattern of Abbott Plate gives the joint a strong unfailing support that preserves track surface and keeps the rail ends from battering, and does so without imposing any obstructions to interfere with paving. The blocks or bricks will fit close against the joint without chopping or the use of special shapes.

The relief of the splice bars from excessive wheel load greatly prolongs their useful life by reducing the wearing and cutting from back action and also lessens the tendency of bolts to shear and nuts to loosen.

Many installations of long standing have demonstrated an appreciable saving in renewals and maintenance costs to say nothing of the smoother riding qualities of the track.

Abbott Plates are made in patterns and sizes to meet every requirement of new track in electric railway service, and can often be utilized to decided advantage in prolonging the life of old track.

*Write for our Book,*
*"Improved Track Appliances."*

312

**Lackawanna Steel Company**
LACKAWANNA, N. Y.
ATLANTA CHICAGO DETROIT ST. LOUIS
BUFFALO CLEVELAND PHILADELPHIA
BOSTON CINCINNATI NEW YORK
SAN FRANCISCO HAVANA

# The
# Gailor Welded Joint

*and only The Gailor Welded Joint embodies these fundamental characteristics of*

## The Ideal Joint

**Permanent conductivity, full-section 100 per cent)—**

**Easy, rapid application without disorganizing traffic or causing excessive fluctuations in the power supply—**

**Economical application by eliminating waste in the making of the weld—**

**Utmost resistance to wear, resulting in maximum life and no upkeep charges—**

**Initial cost less than the usual mechanical, copper-bonded joint.**

### THIS IDEAL HAS BEEN OBTAINED

by the combination of the Gailor Patent Joint and a universal motor-generator welding equipment, which combination can be obtained only through this company.

If you are interested in obtaining these advantages for your property, please write for complete data.

AWCo Trade Mark

**ATLANTIC WELDING
COMPANY**
30 CHURCH STREET
NEW YORK

AWCo Trade Mark

You May Need a Magnifying Glass to See it—but it's THERE

This insignificant—almost imperceptible—unevenness in the rail ends of a newly laid track joint is the "germ" of a bad joint. And it is a mighty malignant germ and grows rapidly.

The only safe way to "treat" it is to kill it when it's young and the best medicine for that is the use of the

Reciprocating Track Grinder

Here is a specific instance which shows very clearly the reduction of maintenance costs that may be accomplished by the application of the Reciprocating Grinder to new track joints.

The disease of corrugations and cupped joints will prove fatal to the long life of track **if neglected.** To check its ravages it should be treated in its early and incipient stages. And the most effective and economical medicine is the application of a Reciprocating Track Grinder which is sold on the basis of "no pay unless you are completely satisfied."

**Differences in height of rails at joints must be removed immediately to conserve the life of the joint. Practice has demonstrated this very forcibly within the last eight years, and I will mention one particular instance out of many where the issue was brought to my attention. Two pairs of compromise splices were installed of the Atlas type where 70-lb. A. S. C. E. rails were connected to 97-lb. 424 grooved section. At the time of installation in 1913 a very slight difference in the surface of the rails was noticed, and we neglected to grind the rails to a smooth surface. This was a single track over which 26-ton cars operated on from a headway of from three to four minutes. Inside of eight months these joints were a wreck, including paving and rail ends. In order to repair them, new Atlas plates were installed, new pieces of rails were cut in, and the joints were then ground to a true surface. After more than two years these joints are apparently as perfect as on the day they were installed. We find this to be particularly true on compromise joints at special work.**

*From a report by the track superintendent of a large electric railway.*

Railway Track-work Co.
30th and Walnut Sts., Philadelphia, U. S. A.

# Twelve things you would like to have your motormen do

Showing recorder location on one of the cars of the Connecticut Company.

(1) Coast more.
(2) Avoid unnecessary stops and slowdowns.
(3) Release brakes early after stopping on level track.
(4) Save power, brake shoes, and wheel tires.
(5) Start and stop smoothly.
(6) Maintain proper headway.
(7) Avoid running at too high speed.
(8) Guard against rear-end collisions.
(9) Lessen the number of derailments.
(10) Report defects promptly—particularly defective brakes.
(11) Use hand brakes occasionally—enough to keep this safety feature in good working order.
(12) Operate cautiously and safely.

**Equipment of your cars with the**

# Arthur Power-Saving Recorder

followed by intelligent interpretation to your men of the meaning of the records established and suggestions for making better records will rapidly educate your motormen to do these things. Big economies and greater safety will result.

**The Arthur Power-Saving Recorder Co.**
**New Haven, Conn.**

***"Power wasted at the brake shoes is the true measure of the motormen's relative efficiency."***

# How to Give More Car

"More Service
at Less Cost"
September 22

## *See Electric Railway Journal*
*September 22*

An electric railway car is just a tool for the manufacture of revenue car miles; and like any other tool its *rate of output* can be increased by suitable means such as:

- Lower floors and steps
- Highest practicable rates of acceleration and braking
- Air operation of doors and steps
- Control and braking interlocking of doors and steps
- Elimination of extra movements in fare and transfer collection

"More Service
at Less Cost"
September 22

In general, any device which by relieving the platform men of fatigue, facilitates the faster handling of the car and its passengers.

## As No Live Electric Railway Ma
## So No Live Electric Railway Manufa

Electric Railway Journ

# Miles at Lower Expense

---

## *See Electric Railway Journal*

*September 22*

“More Service
at Less Cost”
September 22

So, too, the *quality of output* of an electric railway car can be bettered by suitable means, such as:

Ample non-glaring illumination

Minimum noise and maximum safety

Roomy, sanitary, correct posture seating

Automatically-regulated heating and ventilation

Non-slamming, non-catching doors, steps and sash

Finally, *frequency of service*, because the less time the passenger has to stand in the street, the more he will appreciate the comfort of electric railway travel.

“More Service
at Less Cost”
September 22

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## Will Fail to Read This Issue—
## er Will Fail to Advertise in This Issue

West 39th St., New York

We Will Help You
AGREEMENT
BETWEEN THE
GALENA SIGNAL OIL COMPANY of Franklin, Pa.

When you make a Galena Contract, you unload your lubricating troubles on us, and we immediately supply you with the best oils for each service and take steps to eliminate all lubrication and allied troubles. Naturally, this results in a lower cost, and in any event our guarantee protects you.

**Galena-Signal Oil Co.**
**Franklin, Pa.**

# FINANCIAL MEN

## *Appreciate the Savings of*

# Rico Coasting Recorders

> Another economy put into effect is "coasting." A motorman is given strict orders to save power wherever possible. When entering a station, "juice" must be shut off at a certain distance and the train allowed to use up its own momentum. And too, a motorman must not be lavish in applying the "air," because it means wear and tear on the pumps and brakes, and the pumps use up power. It has been estimated that $1000 a day has been saved.—The Wall Street Journal Straws.

This item first appeared in the
WALL STREET JOURNAL.

It was live enough to be lifted for republication in the Boston News Bureau for July 18, 1917.

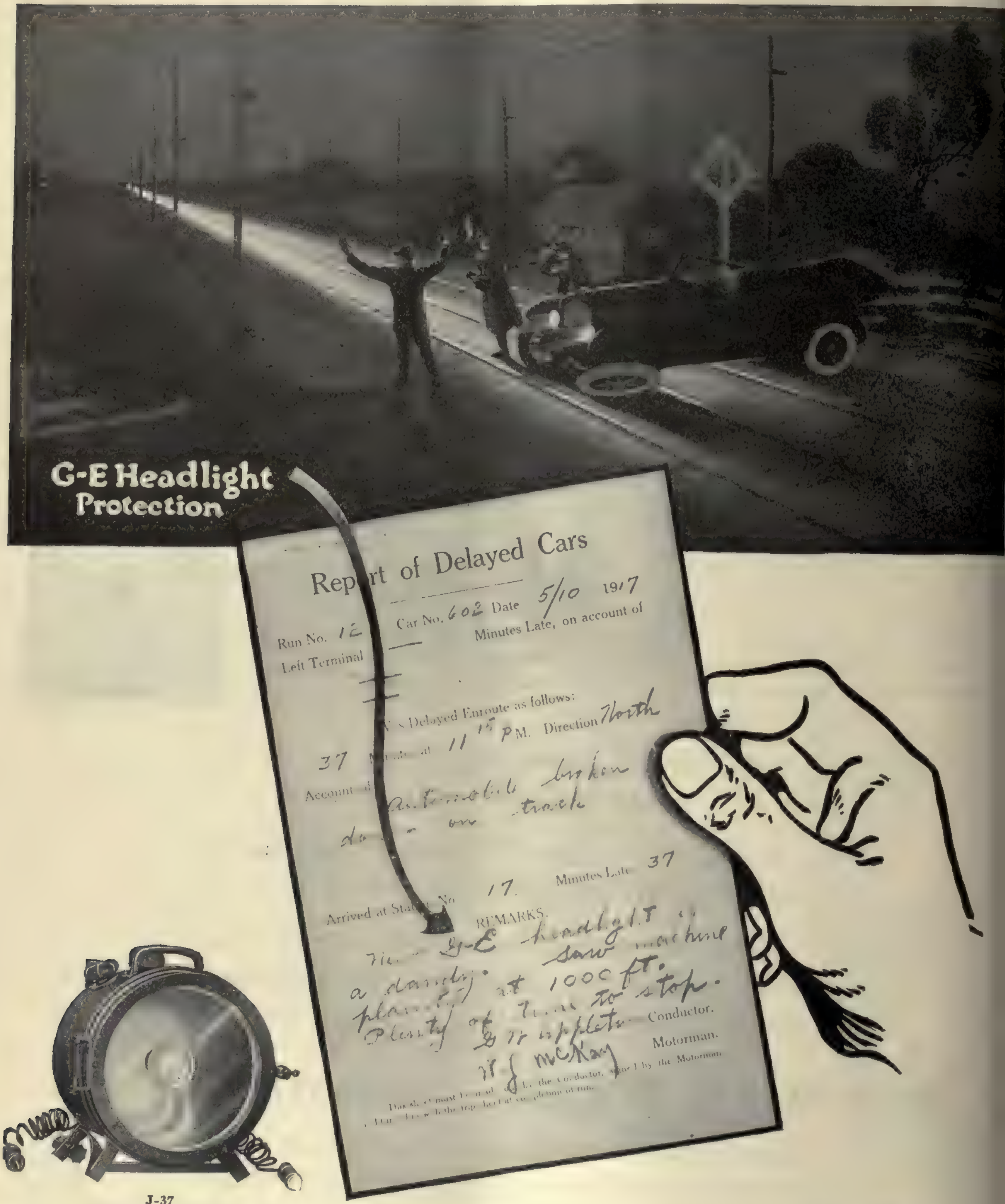
Financial men are keen students of electric railway management. When they find a management like that of the

**Brooklyn Rapid Transit System**

using a device that helps to save $1000 a day, they're not shy about giving credit to the RICO Coasting Recorder.

## Time is the Essence of Railroading

RAILWAY IMPROVEMENT CO. 61 BROADWAY, NEW YORK



Report of Delayed Cars

Run No. 12 Car No. 602 Date 5/10 1917
Left Terminal Minutes Late, on account of

Was Delayed Enroute as follows:
37 Minutes at 11 15 P.M. Direction North
Account of Automobile broken down on track

Arrived at Station No 17. Minutes Late 37

REMARKS.
The G-E headlight is a dandy. Saw machine plainly at 1000 ft. Plenty of time to stop.
G H Appleton Conductor.
H J McKay Motorman.

J-37
Portable Incandescent
Headlight

6869

General Electric Company

General Office: Schenectady, N. Y. Sales offices in all large cities

# Electric Railway Journal

Published by the McGraw-Hill Publishing Company, Inc.
Consolidation of Street Railway Journal and Electric Railway Review

Volume 50 NEW YORK, SATURDAY, AUGUST 11, 1917 Number 6

## City Parking Ordinances Should Be Encouraged

THE figures which we were enabled to publish last week on the results of Chicago's anti-parking ordinance throw a surprising light upon this phase of city operation, and it would be well if they could be brought to the attention of every city government in the country. In Chicago, the prohibition of automobile parking on every car-line street in the business district brought about a saving of no less than 25 per cent of the time formerly occupied by all cars in passing through the congested part of the city. This amounted to an average time saving of 3.7 minutes, but on several lines the gain actually exceeded eight minutes per car. Clearly enough, such a condition in general on a line with reasonably frequent headway would mean that cars entering the congested district would be bunched and moving on a short headway. For cars leaving the congested district, however, the reverse would take place, with the result that frequent headway would be given at points of light traffic and lengthened headway at the points where the maximum service would be desirable. On a line requiring sixty minutes for the round trip the maximum time saving effected at Chicago would cause a 13 per cent increase in service without increasing the number of cars on the line, provided only that the rush hour lasted for more than the round-trip time. The passage of such ordinances, like the introduction of the skip stop, is a measure of co-operation between a city government and a railway that results only in benefit to both, and at present an unequalled opportunity is afforded to establish such co-operation.

## Fundamentals in the Practice of Publicity

MR. LEE, who contributed an article last week on the psychology of publicity, continues his treatment of the subject this week by a discussion on personality in publicity. In the first article he emphasized the necessity of not neglecting the human side of the audience addressed. The typical "lawyer's brief" may be a very convincing argument when presented before a court, but publicity material, if prepared in that form, would not prove very successful. In his article this week Mr. Lee extends his discussion of making publicity material "human" by advocating that personality be put into it. Still a third factor of successful publicity, which Mr. Lee has often dwelt upon, is continuity. The telling of the story should not be left until the pinch comes and when the company is in need. Publicity delayed loses greatly in value. Just now, for instance, electric railway companies are asking for increased fares. Until they decided to ask for greater income they had given the matter of rising costs and fixed fare very little publicity. Delayed until now it cannot possibly have the value that it could have had before these petitions were filed with the Public Service Commission. No matter how true the story of the electric railway may be of rising costs for labor, equipment and taxes, it is now discounted by many because it is being told in conjunction with an appeal for higher fares. The same story told last year, or the year before last and frequently since, would have made the task of convincing the public of the justness of the demand for increased revenue infinitely easier. The public mind would have digested the facts and argument. The present fare campaign will not have been in vain, if it has no other result than to teach electric railway companies this lesson in publicity.

## Belated Publicity and Preventive Medicine

TOO many electric railway men think of publicity work as a last resort, a sort of emergency medicine. And they think of it as something in which they are not fitted to act. They realize perfectly that the public must be informed of the facts in a certain situation, but they don't know how to go about it. "I'm a railway man, not a writer," said one recently, "nor am I a speaker or advertising man. When my child is sick, I do not attempt to doctor it. I call a physician." Now, what the railway man said is true enough, but it calls for some analysis and comment which may show a better way to do things. It is true that the average railway man is not a professional writer. And, true again, he is not a doctor. But of late years we have come to learn that preventive medicine saves a great many more human lives than curative medicine. By preventing the breeding of mosquitoes we prevent the transfer of the yellow fever germ from a sick man to a well man, and yellow fever has lost its standing as a great human scourge. By keeping our drinking water, milk supply, etc., clean, we avoid typhoid fever. By vaccination we prevent smallpox. A public utility that waits until the day of trouble before seeking the good-will and sympathetic interest of the public is like the person who wants typhoid cured instead of having it prevented. The railway side of the question may be absolutely correct, but not all of a cold or uninterested public will accept it. But a public already the friend of the railway is prepared to give a ready hearing to what is said in its support. A person does not have to be a physician to screen his house to keep out flies and mosquitoes. He knows that is good policy so he engages a carpenter to do it. So with publicity. A company decides on keeping the public informed about the service it is directing in its behalf, and if necessary it gets some help to put the statement into form as advertisement, pamphlet, leaflet, or written statement. If only these statements are simple, direct and authoritative, the main objects are attained. And any man intelligent enough to run a good public service can get these qualities into his publicity material.

## Electric Transportation of Farm Products a Benefit to All

IN these days, when the steam railroads are bending all of their energies to the handling of through freight and the electric roads are striving to find those portions of the freight business which they can most efficiently take over, an excellent opportunity exists for the electric roads to develop the transportation of garden products from the farmer to the consumer. A bulletin just issued by the department of market and rural organization of the United States Department of Agriculture, points out some of the essential factors. They are, briefly, a fast but frequent stop service to pick up farm produce within the "commuting" distance, the location of a market for distribution purposes close to the railway terminal, an arrangement by which the shipper or his agent takes possession of the products immediately on their arrival at the terminal, and "organized efforts of the producing community intelligently directed in sympathetic co-operation with the carrier."

The rates charged on the steam railroads for service of this kind, according to the report just mentioned, are somewhat higher than first-class freight rates, yet the steam railroads do not seem to be anxious for it, even in normal times, because of the special features in equipment and treatment required. On the other hand, the chief handicap in the past to the substitution of electric service for steam in this class of transportation, according to the Agricultural Department, has been the lack of adequate and centrally located city terminals and the restrictions imposed on the running of freight cars through the streets. These, however, it seems to us should be merely temporary. If a real need exists for the service and the steam railroads are not in a position to supply it, it must perforce fall on the electric carriers. Freight terminals will be built, as they have been built in Indianapolis, Detroit, and Los Angeles, if there is need for them, and as the chief persons to be benefited by such improved facilities are the consumers, they should not hesitate long in granting freight rights. The bogie that electric freight cars should not be permitted on city streets in reasonable numbers and at reasonable hours might just as well be laid at rest. Electric cars for this service possess a great many advantages over automobile or horse-drawn trucks, and we know of no city where such rights have been revoked after once being granted. This shows that the community appreciates the value of the service rendered. In fact, the Massachusetts Public Service Commission has been conspicuous in advocating broader freight rights for the electric roads in its jurisdiction.

## Do Competitions Always Stimulate to Increase of Production?

THE passing of the date, Aug. 1, on which closes the competition for the medal awarded by the American Electric Railway Association for the best paper presented before a company section, suggests a review of the activities of the sections during the year and a query as to the probable effect which the medal competition has had upon these activities. A tabulation of the eighty or more section meeting programs shows a wide variety of method and material indicating a substantial year's work. There are comparatively few papers suitable for entry in the competition, but among these are several of excellent quality. We predict that the winning paper will be well up to the standard set by previous awards, but we doubt if the competition has directly affected their quality. The award will be more a recognition of good work well done because well adapted to local needs rather than a reward for special effort stimulated by the prospect or possibility of such recognition.

The programs indicate clearly that the sections are using their organizations for the laudable purposes of promoting fellowship among the members, familiarizing the employees with the operating problems of the several departments of each company and broadening the outlook of all with respect to local and national issues. Socials, patriotic gatherings and meetings at which company officials spoke, were conspicuous. Papers, as this term is generally understood, were relatively few. But there appears to have been a fine spirit animating the gatherings, especially at those where patriotism had a chance to manifest itself. The sections which do not get the medal may, therefore, take comfort in the realization that their gatherings were possibly best meeting the local situation even if they did not bring out any epoch-making papers. We wish to commend especially such features as the departmental talks in Washington, Connecticut, Denver, Milwaukee and Manila; the educational lectures in Chicago; the classwork in Toledo; the power plant visit in Newark and the sociability in Hampton, Portland and elsewhere. These things will not be recognized by medal awards but they are accomplishments to be proud of.

While it is the duty of section officers to send to the association office copies of all worthy papers presented at their meetings this should be done as a matter of course rather than in the spirit of rivalry for honors. The history of the Edison medal of the A. I. E. E., the Brill competition in car design, and presumably of others also, shows that production is not stimulated directly by hope of reward. For example, the Edison medal was at first intended to encourage worthy research work, but failing in this it is now awarded to honor men of signal accomplishment. Possibly the present or another association medal might be given to the section or the individual, or both, which contributed most to the development of the local members in efficiency and satisfaction in their work, if there was any way of determining how to make such an award.

## Making the Public See the Other Side

FORCED to it by rising costs electric railway men now realize that they must teach the public to see their side of the increased fare problem. The 5-cent fare has maintained almost a prescriptive right to existence. It has been a convention, a fetish. It is a habit of mind with the public, and it must be changed. The electric railway man sees nothing sacrosanct in the nickel fare. He must provide for the public a street car service. He must sell the kind of a service the public prescribes, and his only customer is the public. Furthermore, this customer sets his own price.

There is no way in the world to get satisfactory business results out of such a situation except to have the public see that the electric railway company has rights and that its interests and the public's interests are interests in common. The public must be led to appreciate that when a company's expenses are growing faster than its receipts, not only is the company headed toward bankruptcy but the public will be the greatest sufferer from that bankruptcy. It will inevitably mean fewer cars, more crowded cars and cars in worse condition, even if it does not mean the disappearance of some car lines altogether.

Now it is principally the fault of the railway management if the public does not see both sides. It isn't enough that electric railway managers have correct ideas about the railway business. The public's ideas must also be correct. If the ideas of the railway men are right and those of the public are not, the companies simply haven't made the public understand the case. They either have not been frank about it or have not talked in the language that the average man understands.

There's no hocus pocus nor mystery about sound publicity. True, there's a certain technical experience necessary to the preparation of any story for publication, but the important thing, without which no amount of technical expertness will avail one whit, is to have an honest case, and then to state it frankly and persistently. And electric railway men have not appreciated the truth and importance of this. Much of the publicity attempted has been cold and formal. It lacked human touch, and its circulation has been confined practically to electric railway men. The public will sympathize with the railway when it sees the point, but no one in the world can make that point public property but the railway man himself.

The electric railway men haven't done this. They have not had the public's sympathetic interest. The proof of this statement is that every electric railway man feels that his business is under more or less public suspicion. They haven't had the public's sympathetic interest because they have neglected to do the things necessary to get it. This situation can be bettered only by persistent and frank publicity, backed directly and openly by men who are strong in the conviction of the correctness of their business methods and the justice of their case.

## The Need for a "Billy" Sunday

THE electric railway business needs a "Billy" Sunday. It needs him to preach the gospel of service to the men in the industry itself. It also needs him to tell the people—in language that they can understand—what the electric railways are doing for them.

The people know "Billy" Sunday, and he knows them. He speaks their own language. He goes to the heart of a subject, not in a roundabout way but straight, fearlessly and without evasion. This explains what he has been able to do for religion.

What "Billy" Sunday has done for the church can be done for the electric railway business. It must be done if a nation-wide epidemic of receiverships is to be averted. There is no time to lose.

The electric railway industry to-day faces a crisis. It has reached the point where it must have more revenue, and it is meeting with opposition when it reaches out for it. Why? Because the public distrusts it!

For years, the industry, like every other ordinary sinner, has been its own worst enemy. It has tried to run its business without taking the public into its confidence. This is about as foolish as trying to run a church without revivals, which can be done, according to "Billy" Sunday, only when a gasoline engine can be run on buttermilk. Yet to-day there are traction managers who marvel that the public should protest when an effort is made to raise fares.

What if the additional revenue is needed? What if the company will go into bankruptcy unless the extra fare is granted? Can the man whose sole conception of the electric railway business has been gleaned while riding to and from work in crowded cars be blamed for protesting the extra charge? How is he to know that operating costs have practically doubled within the last five years?

When the industry finds its "Billy" Sunday, it will find a healthy answer to these questions. It will find, too, that the public, despite what seems to be a callous indifference to utility troubles, is at heart fair. All it demands is a square deal, with the cards face up on the table.

But the time is short. It behooves those who would avert financial disaster to get busy at once and do some "Billy Sundaying" on their own account. In so doing they should remember all the time that "Billy" is a "doer" as well as a talker. Talk without service is so much wasted breath.

In many cases, companies are already giving as good service as possible under unfavorable circumstances. But that fact is not going to be appreciated nor additional revenue made possible for the improvement of conditions until the public has been shown.

"Billy" Sunday has proved that the public is fair-minded at heart and can be reached with the right kind of a story, told in plain speech and backed up by performance. When that fact penetrates the minds of the electric railway managers, the outlook for the necessary increased rates will become brighter.

# Southern Pacific Railroad Extends Oregon Electrification

**Forty-two Additional Miles of Steam Railroad Line on This Company's Portland Division Have Been Electrified at 1500 Volts, Thus Providing Electric Service Throughout the Major Part of the Fertile Willamette Valley Extending South from the City of Portland**

On June 17, 1917, the Southern Pacific Company placed in service an extension of its electrically-operated lines in northwest Oregon whereby 42.3 route miles (47.5 miles of single track) have been added to the 1500-volt direct-current electrification of its Portland division. The new electrification, which runs almost due south from Whiteson to the town of Corvallis, brings within sight the completion of the company's ambitious plan, undertaken a half-decade ago, to have electric operation for every line in the fertile Willamette Valley, excepting a single steam railroad route for through traffic north and south across the State.

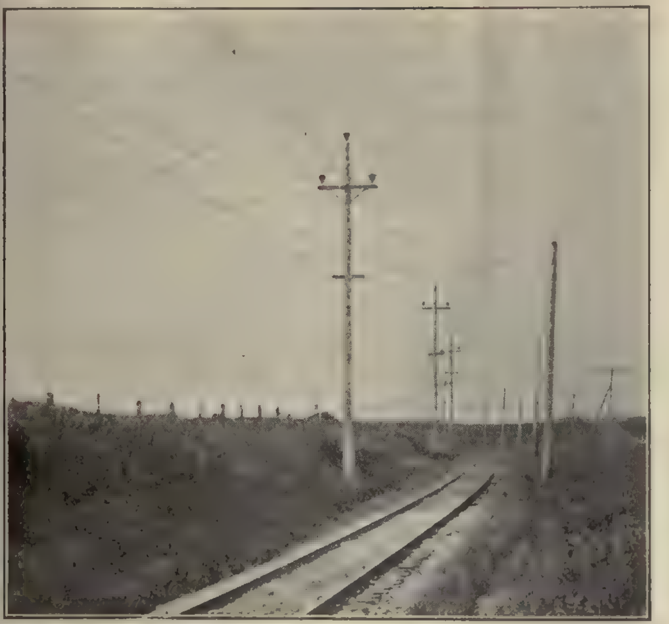
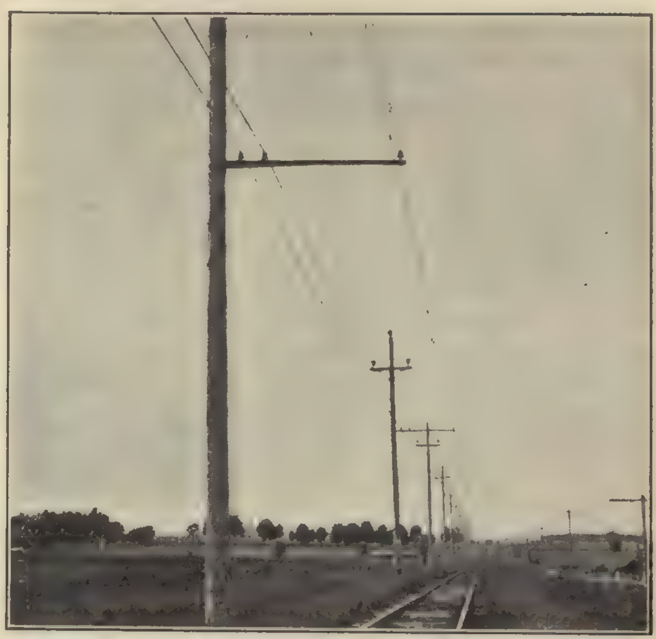
At the eastern side of the valley, which extends for about 100 miles south of the city of Portland, is the Oregon Electric Railway, while the western side is served by the line whose extension has just been completed. Of this latter electrification the first section to be changed over from steam to electric operation was placed in service in January, 1914. This section included the so-called West Side Branch, extending from Portland through the town of Forest Grove to Whiteson; also the Newberg Branch, extending from Portland via Newberg to St. Joseph, where it joins with the first-mentioned line. The section includes also the short Tigard Branch, which connects the two above-mentioned branches by a line between the towns of Beaverton and Cook, making a small loop about 10 miles southwest of Portland. These three divisions make up a total single track mileage of 120. With the latest electrification at the south end of this trackage, there is provided a through route from Portland to Corvallis, the distance via Newberg being 87.8 miles.

In general the new line construction, as shown in the accompanying illustrations, follows general customary catenary standards, similar to those which were used on the first section of the line to be electrified. Such modifications and refinements in details as have been made in connection with the new work are only minor in character and were made as a result of operating experience with the earlier construction. The contact system is made up of a single catenary which has a steel messenger wire supporting a copper contact wire by means of flexible hangers, the latter being in the form of a round steel rod bent into a large circular loop at the upper end and clipped solidly to the contact wire at the lower end. Wooden poles are used, and over part of the route these are extended to support a three-phase high-tension transmission line supplying energy for the two substations that have been installed.

In distributing materials and stringing the messenger wires, trolley wires and feeders, the fullest possible use was made of a work train drawn by a steam locomotive, and a heavy steam-operated locomotive crane with a specially long boom was kept steadily at work during the construction period for loading, unloading and seting the poles.

All of the poles that were used received an open-tank butt treatment with creosote at a temperature of 220 deg. Fahr., this being done by the company at a plant erected especially for this purpose. This plant is shown in an accompanying illustration which indicates the major features, consisting of a framework to hold the poles upright during treatment and a large derrick for handling the poles from the storage piles to the tank and thence to flat cars for distribution along the line. The total number of poles treated at this plant was 2300, and it was estimated that the savings which were made

SOUTHERN PACIFIC ELECTRIFICATION—WORK TRAIN WITH PLATFORM CARS ENGAGED IN STRINGING TROLLEY AND MESSENGER WIRE; TREATING PLANT CONSTRUCTED FOR CREOSOTING BUTTS OF POLES

SOUTHERN PACIFIC ELECTRIFICATION—TYPICAL OVERHEAD CONSTRUCTION ON TANGENTS AND ON CURVED TRACK

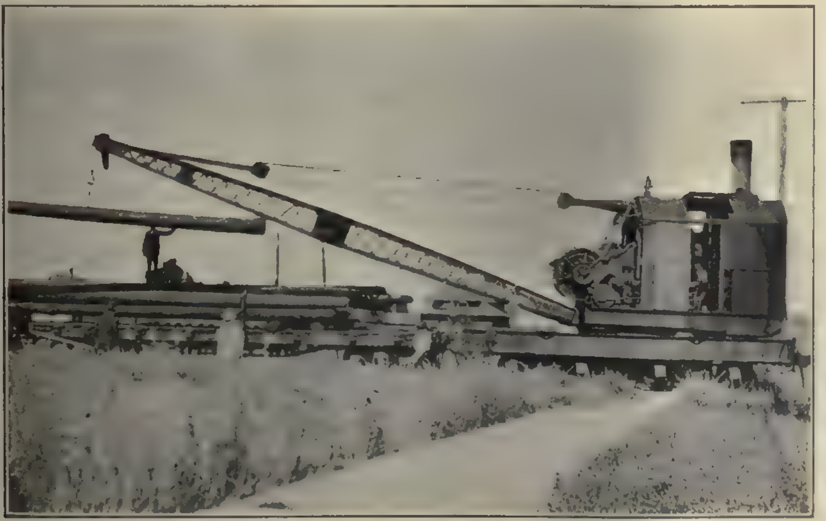
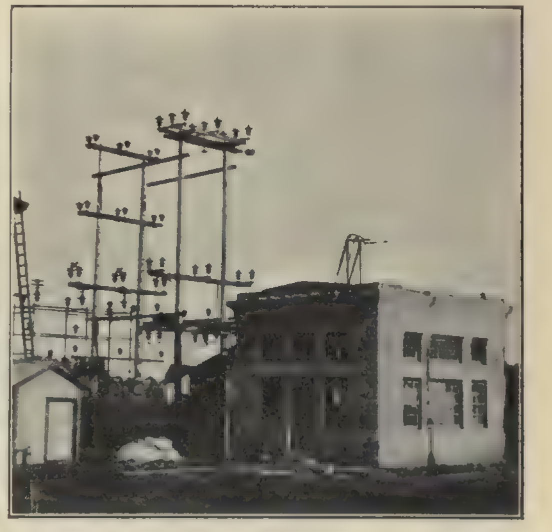
in the cost of pole treatment by doing the work locally paid many times over for the cost of the temporary installation.

After distribution along the line, the poles were framed on the ground, and all material was assembled on them complete. They were then set up in the pole holes by the locomotive crane with a minimum of manual labor. Poles for use on sections of the route where the transmission line is installed are 50 ft. long, but where the poles carry only catenary construction they are 40 ft. in length. The standard spacing is 150 ft., this interval being maintained except on the sharper curves.

On tangents, steel bracket arms made up of a pair of horizontal angles fastened back to back are used to support the catenary, the supporting insulators for the messenger being set on top of the arms. The arms also carry over the greater part of the new line two feeders, each of 636,000-circ. mil aluminum cable. These feeders are supported on insulators mounted on the bracket arms close to the poles. The transmission line is carried on No. 341 Locke insulators that are supported on crossarms near the top of the poles. These high-tension insulators are mounted on Peirce forged-steel pins and Peirce crossarm saddles over the wooden crossarms, which are held square with the poles by steel angles bent to proper shape.

On curves too sharp to permit retention of the bracket-arm type of support span construction is installed. In addition, pull-off wires are used where necessary. In all cases double insulation is provided between the live contact system and the ground, including wood-strain insulators on the span wires and on the guys, where these are used.

The messenger wire that supports the copper contact wire is made of 7/16-in. steel strand with a tensile strength of 15,000 lb., and the trolley wire is standard No. 0000 grooved, this being suspended from the messenger cable by round steel hangers at 15-ft. intervals. In the erection of this catenary construction one entire span was clipped up at one time, four platform cars being coupled together in the work train for this purpose. The average time to clip up a span in this way was one-and-one-half minutes, including movement of

SOUTHERN PACIFIC ELECTRIFICATION—LOCOMOTIVE CRANE USED TO HANDLE POLES; VIEW OF SUBSTATION AT MC COY DURING CONSTRUCTION PERIOD the work train, and as a consequence extraordinarily rapid work was accomplished.

### POWER EQUIPMENT

For the supply of energy to the new extension substations have been erected at McCoy, about 8 miles south of Whiteson, the north end of the new extension, and at Wellsdale, about 26 miles still further south, leaving a distance of about 8 miles to the southern end of the extension at Corvallis. These substations receive energy at 55,000 volts, three-phase, 60 cycles, and convert it into direct current at 1575 volts by means of synchronous converters in series. Each substation contains one 1000-kw. unit, consisting of two 500-kw. machines wound for 787.5 volts and connected in series on the direct-current side. The alternating-current supply is stepped down from 55,000 volts to 580 volts by three-phase, water-cooled, outdoor-type transformers, the secondaries being connected in double-delta and the primaries in star. Outdoor-type 55,000-volt lightning arresters are used. The converters and transformers were furnished by the Westinghouse Electric & Manufacturing Company, and the switchboards and lightning arresters by the General Electric Company.

In addition to the electrical machinery above outlined, each substation contains a motor-driven air compressor for blowing out the converters and for other uses about the station, and there is also a motor-driven triplex pump for keeping up the supply of cooling water for the transformers. Owing to the moderate size of the equipment that is installed, the substation buildings are of minimum height. Their design provided for sufficient elaboration in architectural detail and window arrangement to eliminate the inartistic features so frequently found with structures of reinforced concrete, of which material the substations are built.

Energy for the primary supply of power is purchased from an outside source in the town of Salem, which lies some distance to the west of the middle of the new extension. Consequently a transmission line, 10.7 miles in length, has been built between Salem and the town of Gerlinger through which the railway passes. From this point the transmission line is strung along the right of way on the poles supporting the overhead construction, extending north and south from Gerlinger to the substations at McCoy and Wellsdale. The total length of 55,000-volt line is 34.4 miles.

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## Mileage Rate System Sought

### Boston & Worcester Seeks More Revenue—Asks Authority to Equalize Rates and Lengths of Rides by Changing from Zone to Mileage Basis

THE Massachusetts Public Service Commission held hearings at Boston on July 16 and 25 upon an increase in fares for the Boston & Worcester Street Railway. In his opening statement G. W. Cox, counsel for the company, said that in its fifteen-year life the earnings of the railway had never been sufficient to yield an adequate return upon the capital authorized by the Railroad Commission. The schedule now proposed is calculated to yield an increase in revenue of $90,000, or about 10 per cent. In the main it seeks equalization of rates.

The company proposes to install a mileage system of rates in place of the present zone system with a 6-cent fare unit. The minimum rate of fare is to be 6 cents for 3 miles or less, with a charge of 2 cents per mile for each additional mile or fraction thereof. It is proposed to sell round-trip tickets at 15 per cent discount from two one-way rates, good between the principal points and the eastern terminus of the line at Chestnut Hill. It is also proposed to sell 100-mile books at 15 per cent discount from the regular rate, good anywhere on the system, with a minimum charge of three mileage coupons for any single fare paid. Pupils' tickets are to be sold in lots of 30 miles at one-half the regular tariff rate.

The investment and working capital on Dec. 1, 1916, was $5,205,620. The total revenue requirements, covering operating expenses, taxes, depreciation and a 6 per cent return, are $920,563. The 1916 total revenue was $823,136, representing a deficiency of $97,427 below the requirements. Coal cost in 1917 will show an increase of about $45,000. Material and labor costs also bid fair to rise still higher. Operating expenses in the last eleven months increased $52,000, and operating revenue increased only $19,000. For the last eight years the stockholders have received less than 2.75 per cent on their investment.

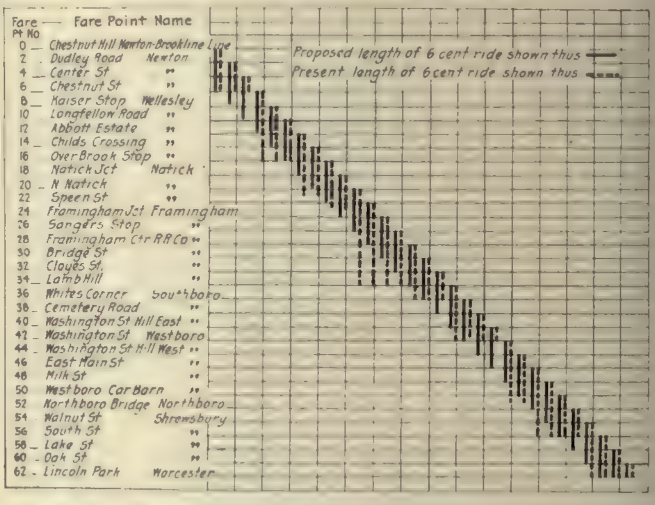

CHART SHOWING INEQUALITIES OF PRESENT 6-CENT FARE COMPARED WITH PROPOSED 6-CENT FARE

The company presented charts showing in graphic form the tariffs existing between all fare points on the basis of the present and the proposed fares. Under the proposed schedule there will be twenty-nine fare points on the main line in the 31.15-mile trip from Chestnut Hill to the terminus in Shrewsbury. These will be twenty-nine 6-cent minimum rides. At present there are twenty-three 6-cent and six 12-cent minimum fares on the main line between the points mentioned. The new schedule shows many reductions in fare as well as increases, for the company plans to equalize the rates and the distances to which they apply. The accompanying chart shows the present and the proposed lengths of ride for 6 cents. On the present schedule the one-way fare between Worcester and Boston (excluding the two 5-cent fares on the city systems at the ends of the Boston & Worcester Street Railway) is 50 cents. This is to be increased to 62 cents on the mileage basis. The competition railroad rate is $1.04, as compared to the one-way trolley total rate of 72 cents. Round-trip tickets are to be sold only at authorized agencies. Conductors will furnish passengers with checks covering their designated destinations.

C. D. Emmons, vice-president and general manager, said that it is not the present intention of the company to screen or remodel its open cars in order to prevent over-riding. About 25 per cent of the service is with open cars and 75 per cent with semi-convertible cars. Mr. Emmons was of the opinion that the work of the conductor will be less difficult than at present on account of the elimination of fare collections in each zone through the mileage check system. Remodelling of cars had not been necessary on the Chicago, South Bend & Northern Indiana Electric Railway, with which Mr. Emmons was associated before coming East.

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# D.U.R. Triples Freight Handling Capacity

### A Spacious New Freight Terminal in Detroit, Including Two Specially-Designed Buildings, Will Materially Reduce Cost of Handling Freight Besides Providing Accommodations for the Increased Volume of Business to Be Expected with the Introduction of Improved Facilities

A NEW freight terminal for the city of Detroit has just been placed in operation by the Detroit United Railway to supersede its original somewhat crowded facilities. Although the sale to the Pennsylvania Railroad of the land where the present freight house is located really precipitated the building of the new terminal, yet the improvement was necessary, and more than justified by the marked congestion which prevailed. Conditions had reached the point where the great amount of traffic through the old terminal necessitated a considerable rehandling of shipments in order to make deliveries, and this, of course, added greatly to the terminal costs. The company was also forced to issue embargoes from time to time in order to clear up the congestion. This, and the delay to the teams of the shippers in discharging and receiving commodities, caused a loss of available business which the electric line will now not only be able to secure, but which will flow to it in increasing volume owing to the promptness with which teams and trucks will be released from the freight house, coupled with the faster-than-express service which has been consistently given for goods in transit.

The new terminal is located on the east side of the city, just outside the 1-mile zone from the city hall. This situation is convenient and reasonably central to many manufacturers and wholesale jobbers. Shippers on the west side of the city will temporarily have a rather long haul, but this condition will be alleviated within the year by the construction of another similar and slightly larger freight terminal, 1½ miles to the west of the city hall, on which work was begun June 15.

In the ELECTRIC RAILWAY JOURNAL for April 21, 1917, were shown the general layout and cross-sectional view of the East Side terminal. This includes an inbound freight house, 60 ft. x 405 ft., and an outbound house, 45 ft. x 405 ft. These two buildings and the five-track space between them occupy one entire city block, the streets along either side serving as the team and truck way for the station. In addition to this block, one-half of the next block beyond, from the street to the alley line, is utilized for storage space and for loading

DETROIT FREIGHT TERMINAL—VIEW SHOWING TRACKS BETWEEN INBOUND AND OUTBOUND FREIGHT BUILDINGS

DETROIT FREIGHT TERMINAL—CABINET FOR CURRENT RECORDS ON SECOND FLOOR OF OFFICE

directly from wagons into the cars. On this piece of ground are four team and storage tracks, 600 ft. long, which connect directly with the tracks between the two buildings. A 20-ton wagon scale is installed at the front end of this open yard. Here also will be constructed immediately an automobile loading platform, an open platform for storing empty oil barrels and other empty containers, etc., and a covered milk platform. This open yard will not only provide space for efficient use at present for loading direct from trucks to cars, but also provides space for future expansion of the buildings when the present floor space shall have reached its capacity.

Both buildings are of red-brick and timber construction, with a two-story office section at the front end of the inbound house, the remainder of the two buildings being of one-story height and having monitor-type roofs. The structures are protected throughout by an automatic sprinkler system. On the track side of each building is a concrete platform 8 ft. wide, covered with a canopy which slopes back toward the building wall, from which it projects 11 ft., thus extending well out over the car roofs, and eliminating very largely the drippage of water onto the freight as it is wheeled into the car. The five tracks between the two buildings are laid on cinder foundation, and will be used two on each side for the cars in process of loading and unloading, leaving the center track free for through movement of cars, although this, too, may be used as a loading track if necessary.

### THE OUTBOUND FREIGHT HOUSE

The outbound freight house is two bays wide, a total of 45 ft., with practically continuous doors on the track side and pairs of doors with a 35-ft. storage space between on the receiving side. These doors are of wood construction, and counterbalanced so that they may be lifted easily. The floor inside the building is made up with a concrete base, on which an asphalt cushion and binder, and a layer of 3-in. plank are laid. On top of this is a layer of 1-in. tongue-and-groove hard maple flooring. This construction was adopted because of the long life expected from it and because of the fact that it is comparatively noiseless for trucking and not so hard on the men's shoes and feet as cement. High tables, 16 in. x 24 in., are placed at each door on the receiving side for the use of the checkers.

The continuous windows on both sides of the monitor roof and the large side windows make the building particularly light and airy. The upper windows are mechanically operated from chains at several points through the room. Artificial lighting is supplied by large type C lamps in enameled steel reflectors, installed one in every other bay on each side of the center posts, and staggered on opposite sides. All wiring is in exposed conduit.

At the far end of the outbound building a chain hoist is mounted on a monorail extending across the building, and is used for handling heavy shipments. The end bay has been partitioned off temporarily for the use of the Adams Express Company. At the opposite or front end of the building is a baggage room, 45 ft. x 30 ft., in which a 1000-lb. American Automatic scale is installed. Just behind the baggage room is a hot-and-cold room, approximately 20 ft. x 20 ft., built with cork-and-plaster walls, and utilized principally in the winter for protecting perishable shipments from freezing while awaiting shipment. This room may be heated from the steam coils installed on the side walls.

### THE INBOUND FREIGHT HOUSE

While the width of the outbound freight house was made as narrow as consistent with providing the necessary amount of floor space within the length permitted by the property (in order to keep the trucking distance down to the minimum), the inbound house was made as large as the area of the property and the appropriation for the building would allow. The amount of freight accumulating in the outbound freight house can, of course, be very largely controlled by the railway company itself, while the accumulation in the inbound house is dependent upon the consignees, and therefore involves the need for much greater storage space. This accounts for the 60-ft. width of the inbound building as compared with the 45-ft. width of the outbound building.

With the exception of width, the inbound freight room is a duplicate of the outbound freight house. The floor, roof, daylight and artificial lighting, general construction, fire protection, etc., are the same. The hot-and-cold room in this building is of the same type of construction, but is made larger to accommodate the greater accumulation of freight, and is more used,

DETROIT FREIGHT TERMINAL—FRONT ENDS OF BUILDINGS HOUSING OFFICES oth in summer and winter, in taking care of the perish-bles upon arrival.

The hot-and-cold room in the inbound house incloses space 36 ft. x 44 ft., and is intended to provide enough eat or enough cold to protect any perishable freight hich may be received. This room is insulated against he outside temperature by cork walls covered with a pecial plaster inside and outside. It is equipped with heat racks and other facilities for handling the more ommon perishables. The cement floor within the hot-nd-cold room is equipped with drains so that it may be eadily washed out as needed.

The inbound freight room is equipped with a chain-oist monorail system opposite that in the outbound ouse, and two American Automatic 4000-lb. scales are nstalled for checking up on freight weights. Four rinking fountains are installed along the street side f the freight room for the use of the employees and eamsters. The doors on this side of the building are ractically continuous, while on the receiving side of he inbound house they are grouped in five pairs, with 5-ft. spaces between for storage purposes, the same s in the outbound house. Timber racks for the storage f long pieces of any kind are installed, two on the in-ound-house receiving platform and three on the out-ound-house delivering platform, and these are found seful in keeping various long pieces of material off he floors.

A large room on the second floor at the front end f the freight room, just behind the two-story office ection of the building, has been equipped with tables nd benches, hot and cold water, and other conveniences or the use of the warehouse workmen. This room is nished in white plaster, and this, together with the olid row of windows on the two sides, makes the room ery light and airy.

### Freight Terminal Office Arrangement

As before mentioned, the front 60 ft. of the inbound reight house is two stories in height, and is utilized or office purposes. On the first floor, entrance is made t the front of the building, through a small vestibule hich opens into a large lobby across the front of the uilding. Four windows of the cashier's office and the indows of the cartage company's office open off this lobby and provide facilities for handling a very large volume of work. From the far end of this lobby a stairway leads to the second floor, where a lobby inclosed by a broad wood rail brings shippers in contact with the local freight agent and the general freight clerks. Two additional entrances are provided on the first floor for the special use of employees. The one on the street side of the building opens into a lobby from which employees may enter the cartage company offices or the first-floor freight offices, and off from which a wide passageway leads into the inbound freight house for the use of the warehouse employees. The entrance on the track side of the building is for the special use of freight conductors. As they enter the lobby on the first floor, there are windows off this lobby through which they may turn in their bills and then go upstairs, where windows off another lobby at the top of the stairs put them in touch with the billing clerks, from whom the outbound bills for their next trip may be received.

DETROIT FREIGHT TERMINAL—INTERIOR VIEW OF INBOUND BUILDING, SHOWING FOREMAN'S OFFICE AT LEFT

DETROIT FREIGHT TERMINAL—TEAM SIDE OF OUTBOUND BUILDING

On the first floor also are the offices of the express-bill clerk, the freighthouse foreman, the cashier and the clerks working in these offices. The various offices are separated by wire grille partitions in order to gain the maximum in lighting and ventilation, but the cartage company's office is separated from the railway company's by partitions. Both upstairs and down, the walls of the offices are finished with white plaster and the wiring conduit for the ceiling fixtures is exposed.

On the second floor, except for the private office of the local freight agent, the office is all in one large room. In this space are located the chief clerk and general clerks in the outbound building, accounting, claims, overs and shorts departments, and the stenographers, tracing clerks, filing clerks, etc. A record filing cabinet for current bills, 32 ft. long, is placed in this large room in such a way as to separate the office into an inbound and outbound section. This cabinet is made up in three sections, with pigeonholes 19¼ in., 10¼ in., and 8¾ in. respectively, from the floor to the top. By building the cabinet in three sections it will be possible in the future to separate and place the sections in different locations if this proves more advantageous. Accommodations are provided in the cabinet for approximately six months' records, and the storage of records beyond the capacity of this is taken care of in a room especially equipped with shelving on all four walls and located adjacent to the main office room. This shelving is arranged to accommodate different sizes of records, and will take care of old records for from three to five years. In addition to the shelving on the walls there are four sections of shelving in the center of the room, all of open construction. A large skylight, in addition to windows on one full side, makes the room very light and especially fitted for old record work. A binding machine is installed in this room to facilitate the keeping of the records in more compact form.

Windows on three sides of the office section of the building, and a skylight in the center at the back, make the good day-lighting one of the special features of the new terminal-office layout. Specially designed desks for the use of the clerks throughout the freight offices were furnished as part of the equipment. These desks are 48 in. x 60-in. quarter-sawed oak, with flat top and a single drawer on each side. The center drawer was omitted in order to place a brace between the drawers underneath the table. Except for the two drawers per desk, they are simply unusually well-built tables, but their uniformity will add materially to the appearance of the offices.

With the new terminal in full operation it is estimated that the terminal facilities of the Detroit United Railway in Detroit will be increased from three to fivefold. The increase in capacity cannot be measured only by the comparison in floor area, for the elimination of extensive rehandling, due to the better facilities, and ability to segregate shipments for various points, multiply the capacity much more rapidly than the floor area involved increases.

## Safety Rhymes at Kansas City

The Kansas City Railways have just published a "safety-first" edition of several of the Mother Goose rhymes for distribution at the end of the school term among all the children in the kindergarten and first grades in the city schools. Copies will also be sent to every home in Kansas City where there are children. It is estimated by A. B. Atchley of the publicity department that at least 50,000 copies will be required. The pamphlet contains twelve pages with colored illustrations. Two typical pages are reproduced.

TWO PAGES FROM "SAFETY-FIRST" PAMPHLET OF KANSAS CITY RAILWAY

## War-Time Cost of Power-House Coa

### Data in Graphical Form from Records of Connecticu Company, New Haven, Conn.

THE accompanying coal-cost chart, reproduced fro one of a number recently compiled by the power d partment of the Connecticut Company, puts in tangibl form one reason for the increase in the cost of furnishing electric railway service.

In the chart the data for 1915 are averaged for th year, the dash line showing that the monthly averag total cost of coal for the Berlin, Bridgeport, Hartfor and New Haven power plants for which the chart wa drawn was about $8,300. The corresponding unit cos of coal at the yards was about $3.38 per ton of 2240 lb., as shown by the dot-and-dash line. On May 1, 1917, the unit cost had risen to $6.25 per ton.

This coal is brought from Pennsylvania and Wes Virginia, an average distance of about 450 miles. Its heat content is approximately 14,000 B.t.u. per pound. The output of the plants in 1915 was roughly 73,415,000 kw.-hr. and in 1916, 81,363,000 kw.-hr. All contracts for coal expired on April 1, 1917.

It will be noted that the total cost of coal in the yards has been falling off since the first of the year. This is due to the fact that contract coal did not come forward during the winter months.

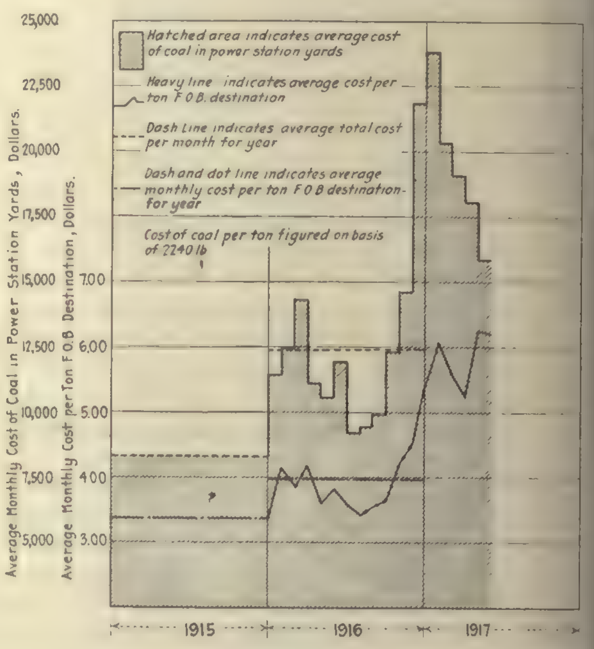

CHART SHOWING COSTS OF COAL AT CONNECTICUT COMPANY POWER PLANTS

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In view of the fact that the younger men of the country will shortly be called into military service, the management of the Pennsylvania Railroad has decided to suspend, temporarily, the regulation covering the age limit for employment. The rule heretofore in force prohibited the hiring of new employees, in any branch of the service, above the age of forty-five years. Under the new rule, which has been adopted to meet war conditions, persons between the ages of forty-five and seventy years may be employed during the war and for a period of six months thereafter. Inasmuch as such employment is not to be considered permanent, it will not carry with it pension department privileges.

# Personality in Publicity

## How Electric Railway Companies Should Word Their Notices—Other Suggestive Hints of Ways in Which Electric Railway Companies Can Secure Better Public Relations

### By IVY L. LEE

JOHN WANAMAKER'S great success is due more than anything else to publicity, and when I say publicity I do not mean merely the advertising of what he has to sell. He has put his remarkable personality in his advertising in such a way that his pages in the New York and Philadelphia papers command universal attention.

It costs John Wanamaker thousands of dollars every year to talk to the public—not about his wares—but about his personal views of what's going on in the world.

Not long ago he decided to close his store all day Saturday for part of the year. Of course he had to announce the fact that he would close, but that could have been done in but little space. Instead, he printed a signed article telling the public at some length just why he was closing his store. What was the result? John Wanamaker got the credit of starting the Saturday closing for department stores. A number of the large New York stores were the first to take the step, but they didn't tell the public with the rare skill that John W. did.

What John Wanamaker has done to department store publicity every electric railway manager can do to his own. He can put the personality of the management forward in such a way that the people will realize that the men who run their street cars have red blood in their veins, and they are, above all, human in their regard for the public.

Take, for instance, a change in routing that must be made. Possibly it is one that at first may give promise of proving unpopular. How would the average electric railway—the A. B. C. Company—announce it? It is a hundred to one that a sign would be posted in the cars reading like this:

"Effective Oct. 1, 1917. Notice.—Green street cars will run south through to Thirty-fifth Street and return northbound by First Avenue, instead of Broadway."

Could anything be colder? Is it any wonder that people sometimes feel that some electric railway managers sit up nights trying to think of ways to irritate the public? I don't know of a better way to incur hostility than to put the word "Notice" at the top of a statement to the public.

How much more reasonable it would have been if John Smith, the president of the A. B. C. Company, had put small folders in his cars giving all the reasons for the change, showing how it would improve the service, etc. Such a notice should, above all, show the personal concern and regret of the manager that it was necessary to disturb an arrangement which to some had become almost a habit.

An American comedian returned from England not long ago and told of his cold reception by London audiences. He said his jokes "got over" all right, but they "lay there." And that is just what happens to about 90 per cent of the notices to the public issued by electric railways. They don't "get across"; and then, when the people and the newspapers protest, the management says the public and the newspapers are unreasonable, that they would complain regardless of what was done. That may be true to a certain extent, but at least give them a chance to be reasonable. Take them into your confidence and tell them why you do things and tell them before you do it.

In some places the back of transfers is used for advertising. It would be worth more if this space were used for some personal message or comment from the manager of the company. It should be changed every day if the date is printed on the transfer, or, if the transfers are arranged so that the date is indicated by punch marks, the message should be changed as often as the company can easily arrange to do so.

The John Wanamaker of the old days stood at the door of his store, helped the ladies out of their carriages and gave them a pleasant good-morning. Every one, rich or poor, received a greeting. Now the store is too large for that, so the wise manager adds this same touch of personality through his publicity. That's what the manager of the electric railways must do. The horse-car driver knew all of his passengers, and there was a cheery good-morning for each. And to-day it is equally important that the manager have a way to keep in touch with the public who are using his cars. Unless the management understands the patrons of its lines, how can it expect the patrons to understand the company?

Some time ago the Pennsylvania Railroad—one of the pioneers in publicity—began to issue poster bulletins to the public. They dealt with various topics. They attracted attention and accomplished good, but they brought forth from a number of people one criticism which was deserved. They were too impersonal, too cold. The reason was that the signature at the bottom of the poster was "The Pennsylvania Railroad Company." Later, one of these posters was issued over the signature of the president of the railroad, Samuel Rea, and the effect on the public was very different. People always like to know the individual with whom they are dealing.

In all publicity work by far the most essential thing is that it be kept human. People generally don't care much about gross and net, but if you talk gross and net in terms that mean something to them, you can gain their attention. By combining with this simplicity, consideration and humility great progress can be made in securing the public's good-will.

# Joint Interurban Freight Facilities for Indianapolis

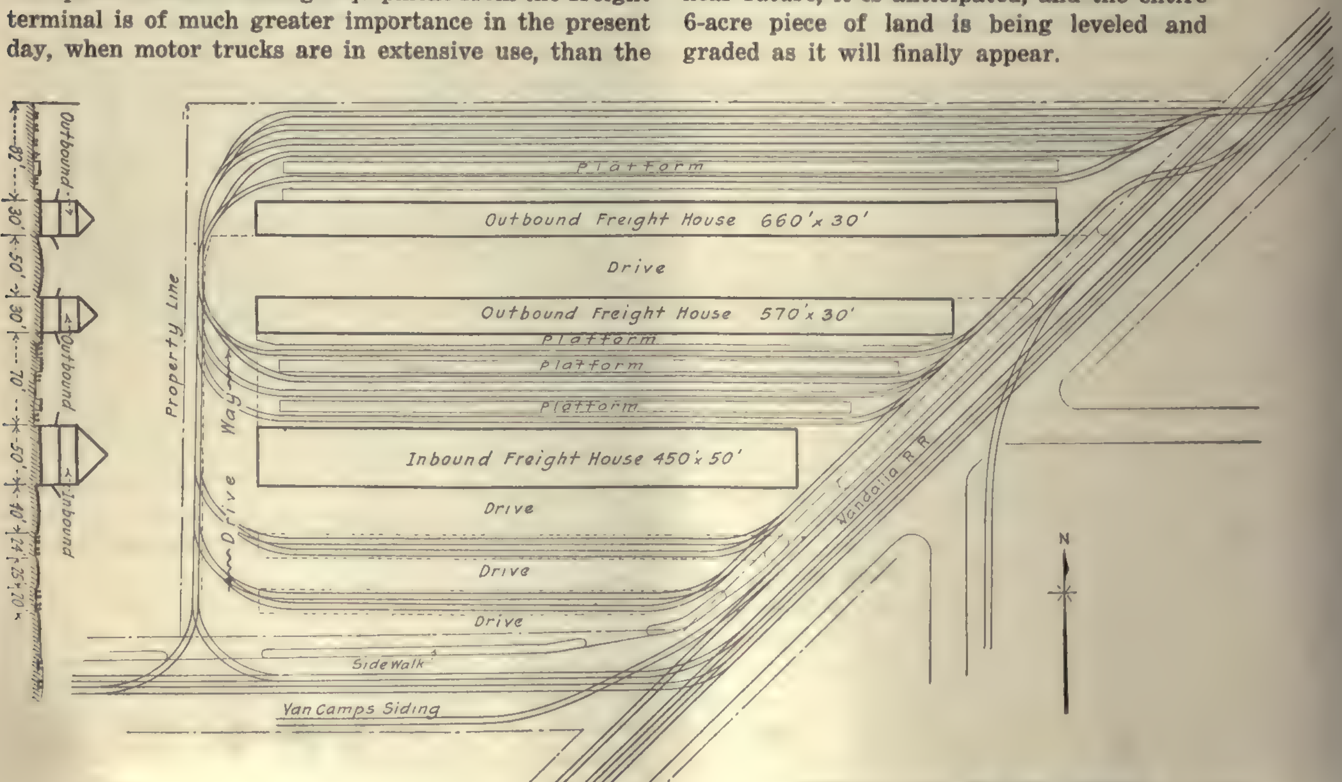
### A New Freight Terminal Which Covers a 6-Acre Tract Is Now Under Construction—The Freight House Floor Area Will Total 60,000 Sq. Ft., in Addition to Ample Platform Space and About 1½ Miles of Loading, Storage and Team Tracks

An electric railway freight terminal that will be one of the largest in the country is now under construction in Indianapolis, the estimated cost being $500,000 exclusive of the land. It will serve the twelve radiating lines of the Union Traction Company of Indiana, the Terre Haute, Indianapolis & Eastern Traction Company, the Indianapolis & Cincinnati Traction Company and the Interstate Public Service Company, comprising a total of approximately 1100 miles of track without including the numerous connections with other electric railway properties which do not enter Indianapolis but which handle a large interchange of through freight. The new terminal will increase the freight-handling facilities of Indianapolis by four or five times and will alleviate the costly congestion occurring daily with the present terminal as pictured in the illustration on the opposite page.

The new terminal is to be located on a 6-acre trapezoidal piece of ground only a few blocks southwest of the interurban loop in the center of the city and on the same side of the loop as the wholesale district. Although the present freight terminal is located exactly in the center of the city, and the new layout will be several blocks away from this point, yet the advantages of quick unloading possibilities will much more than offset the greater haul which will result in some cases. The quick release of cartage equipment from the freight terminal is of much greater importance in the present day, when motor trucks are in extensive use, than the distance of haul, for the trucks move so rapidly that the time and expense involved in hauling shipments a few blocks farther is of practically no consequence as long as there are facilities whereby it will not be necessary to keep the trucks standing idle awaiting a turn to unload. Also, when trucks are held, the motor is frequently allowed to run idle and continue the gasoline cost. The important consideration, then, is sufficiency of terminal facilities rather than location of terminal.

## Three Freight Buildings to Be Erected

Three large buildings will be included in the new project. There will be two outbound freight houses, 30 ft. wide and 660 ft. and 570 ft. long respectively, with a 50-ft. driveway between them and tracks on the opposite side of both. The inbound freight house will be 50 ft. wide and 450 ft. long with a 40-ft. driveway along the south side. At the present time, 432 ft. of the 660-ft. outbound freight house only will be built and this will be used in conjunction with the present freight facilities at the traction terminal building. This one house, however, will be of sufficient capacity so that it will be possible to handle completely the shipments of the largest company now using the old terminal, and thus greatly relieve the pressing congestion which now prevails. The remaining buildings will be erected in the near future, it is anticipated, and the entire 6-acre piece of land is being leveled and graded as it will finally appear.

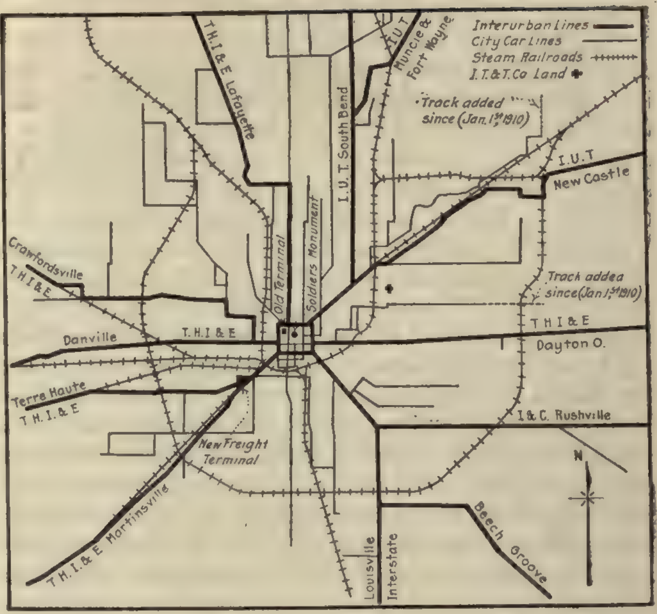


INDIANAPOLIS FREIGHT—GENERAL LAYOUT OF NEW TERMINAL

The buildings will be constructed of "Saraband Chinchilla" brick varying in color from rough-faced red to slate. Plans call for concrete foundations and steel roof, if the steel can be had, otherwise wooden-truss roofs will be used. The roof will be covered with Federal tile, which are pressed, ribbed, reinforced concrete slabs, 4 ft. long and 18 in. wide, and colored red. The side walls are divided into 16-ft. panels with 6-ft. pilasters and 10-ft. doors, placed opposite on the team and track sides of the buildings. Kinnear rolling steel doors will be installed throughout and there will be windows above the doors on the north walls. The east 64 ft. of the first outbound building to be constructed will be two stories in height with offices on the second floor and with the heating plant and toilet and locker facilities in the basement. This office space will provide record storage and general office space sufficient for one company, and additional office space will later be provided in one of the other buildings.

### TRACK AND DRIVEWAY LAYOUT

Considerable study was given the consideration of the track layout, building width, driveway areas, etc., by Thomas B. McMath, chief engineer of the Terminal Realty Company and the Indianapolis Traction & Terminal Company, and by other officials of the traction companies. The aim was to provide a general layout which would provide an egress for car and team traffic involving the least interference of one with the other, and also to provide track and driveway areas which would be commensurate with the floor space in the buildings. It was determined that more team way in proportion to the area of the house was needed for electric railway work than for steam road service, because of the fact that a much larger number of trucks and wagons must be handled for a given tonnage of freight at the electric railway terminal than at the steam road terminal. The average load delivered to the Indianapolis terminal is less than 1 ton, and this fact gave rise to the wide driveways shown in the general layout.



INDIANAPOLIS FREIGHT—MAP OF INTERURBAN LINES IN CITY, SHOWING RELATIVE POSITIONS OF OLD AND NEW TERMINALS

The track layout in general will involve loop operation with entrance and exit to the various tracks inside the property line along the diagonal front of the property at the southwest corner. Altogether there will be thirteen straight tracks through the yard, these being separated by the buildings, platforms and driveways. There will be five tracks along the north side of the property, of which the first three or four will be used for setting cars for loading from the north outbound freight house, and the outside track will be reserved for through movements. The four tracks between the

INDIANAPOLIS FREIGHT—CONGESTED CONDITION PREVAILING AT PRESENT INDIANAPOLIS TERMINAL outbound and inbound houses lend themselves to very flexible use. Three of these tracks adjacent to either house may be readily used either for outbound or inbound freight purposes, making the four tracks, with the help of the two platforms, almost equivalent to six tracks. All platforms in the yard extend the full length of the straight track and are of sufficient width (10 ft.) to permit of double trucking. Two pairs of tracks at the south side of the yard will provide space either for the storage of loaded or empty cars, or for team tracks in loading commodities direct from the trucks to the cars. At the present time only the five tracks at the north side of the yard and two tracks past the future inbound freight house will be constructed.

All driveways will be paved with granite block. The track will be laid on gravel ballast with oak ties spaced on 2-ft. centers, using 70-lb. rail on the tangent tracks and 7-in., 91-lb. rail in the special work, the latter being furnished by William Wharton, Jr., & Company, Inc.

A comparison of the present facilities at the old terminal, which includes four buildings, averaging 24 ft. x 195 ft. in dimensions, with those to be provided by the new terminal, is given in the following figures:

| | Old Terminal | New Terminal |
|---|---|---|
| Area of outbound house | 12,350 sq. ft. | 36,900 sq. ft. |
| Area of inbound house | 6,650 sq. ft. | 22,500 sq. ft. |
| Length of inbound loading track | 2,000 ft. | 960 ft. |
| Length of outbound loading track | | 2,320 ft. |
| Length of loading track in and out | | 1,180 ft. |
| Length of storage track | .... | 1,400 ft. |
| Length of team tracks | .... | 1,340 ft. |
| Driveway area (track empty) | 32,400 sq. ft. | 48,750 sq. ft. |
| Driveway area (tracks occupied) | 18,000 sq. ft. | 48,750 sq. ft. |

The area around the old buildings is entirely paved and is used by both teams and cars, and when not many cars are set there is ample space for teams and trucks. However, any switching movement greatly disturbs the handling of freight and the positions of teams, and delay occurs because of these obstacles. This condition will be entirely eliminated by the new terminal facilities.

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# How the Higher Fare Movement Is Progressing

### Notes from the Electric Railway Industry to Show How Applications for Increased Fare Are Being Decided or Argued, and How the Revenue Problem Is Being Explained to the Public

THE question of higher fares for electric railway service is a live one in many communities, as the following articles will indicate. These stories are in addition to several appearing in the regular Traffic and Transportation department of the news section. All in all, the articles indicate that regulating bodies, although they are reluctant to grant relief except in individual cases after the presentation of full evidence, are considering seriously but actively the need of electric railways for higher fares.

## Blanket Relief Denied in Missouri

### Commission Turns Down Application of Utility Association on Ground that Individual Cases Must Be Presented

ON Aug. 7, the Missouri Public Service Commission denied the application of the Missouri Association of Public Utilities for a blanket order whereby that association would have been empowered to increase the rates of each one of its 303 member companies. In handing down its unwritten decision the commission held that a specific case should be presented by each one of the utilities that is desirous of securing higher revenues.

The commission contended that it has not the right to authorize an indiscriminate increase in rates of each of a number of individual companies on the motion of an association of which these utilities are members. Moreover, it asserted that it has never attempted to establish a rate without first knowing the valuation of the property involved. The board therefore ruled that each member company must make an individual application unless the association can show that conditions in a number of cities are identical and that a uniform rate exists in these cities.

While the electric railway interests in Missouri were not specifically mentioned in the application, such companies are members of the association and naturally, it is said, were included in the request made. The petition for the 303 companies, which was filed on Aug. 3, sought authority to raise rates to meet "the appalling increase in operating expenses." The application included tabulated data showing, for instance, that the price of coal had increased from 50 cents a ton at the mines in April, 1913, to $2 per ton in May, 1917, and that the maximum prices for Illinois coal fixed by the government are $2.75 for mine-run and $3.50 for domestic sizes.

As regards the prices of general supplies and labor, the petition set forth averages obtained from seventy-six answers to a circular letter sent to utilities in Missouri. A tabulation of these reports showed the following advances in prices during the last five years: Steam coal, 49 per cent; coke, 66.6 per cent; wood, 13.8 per cent; fuel oil, 72.3 per cent; lubricating oil, 24.4 per cent; gasoline, 71.9 per cent; office help, 32.3 per cent; plant labor, 25.4 per cent, and freight, 16.2 per cent. This made an average increase of 47.4 per cent. Coal purchased on the open market because of expiring contracts or failure to obtain supply on existing contracts resulted in an advance of 119.1 per cent. Cases of this character, however, were not taken into account above.

Data collected from the discount sheets of supply houses showed advances in prices during the last three years as follows: Malleable fittings, 78.5 per cent; cast iron fittings, 155.5 per cent; brass valves (regrinding), 78.3 per cent; straight-way valves, cast iron, 93.8 per cent; 4-in. (10.16-cm.) boiler tubes, 226.4 per cent; 2-in. (5.08-cm.) wrought-iron black pipe, 125.7 per cent; pig lead, 188.8 per cent; waterproof copper wire, 131.4 per cent; pole-line hardware, 110 to 144.4 per cent. The average advance in this class of items amounted to 136.4 per cent.

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## Explaining the Six-Cent Fare

### How the Bay State Street Railway Has Made Plain the Need for and the Effect of the New Rates Granted to It

ELECTRIC railway men in general are so familiar with the idea of applying higher fare units to their lines that sometimes the whole public's point of view in this matter may not be fully appreciated. Because a passenger is a regular patron, it by no means follows that he has any personal interest or knowledge of the company's financial problems. Even after a fare increase has been authorized by a commission, there are unquestionably many people to whom the news of a higher fare unit comes as a distinct surprise. Hence it is very important, even after arrangements have been made for higher fares, to let the traveling public know the reasons for the increase and just how the new units or changes in facilities apply to local lines.

An excellent example of this kind of publicity is afforded by the work of the Bay State Street Railway, Boston, Mass., in connection with the latest fare increase on its system. To make absolutely plain the necessity for the increase and the exact tariff and transfer arrangements approved by the Massachusetts Public Service Commission, booklets were prepared for every division on the road showing the price of service, the reasons for the increases and the need of co-operation on the part of the public in the handling of the new rates. Each booklet contained a foreword by President Sullivan pointing out the nub of the company's financial requirements. This touched upon the rising cost of labor and materials since the beginning of the war (labor alone is getting $768,000 more a year than in 1914), the company's petition, the compromise rates adopted for six months' trial, and the vital importance of the public's good-will in making the experiment.

The communities whose representatives conferred with the company obtained a modified increase in rates in comparison with the charges which the company considered necessary, and the foreword frankly stated that if the increase does not prove sufficient the company will have to ask for more at the end of the six months' trial period. Finally, it was pointed out that the company intends to use the additional revenue in giving better service by improving the equipment, and in return for public co-operation the management promises to do its best to make the trial schedule a success.

On the Lawrence division, to take a single illustration, the fare changes and foreword required a twelve-page folder. Complete information was included with regard to the use of tickets, transfers and fare collections on every route maintained by the company. Opportunity was given for the purchase of tickets on the basis of twenty rides for $1 a day in advance of the putting into effect of the new schedule. On all its divisions the company endeavored to make a general distribution of the pamphlets and to meet the public fairly and squarely. The result, as evidenced locally in a statement of the Lawrence Chamber of Commerce, was most gratifying. This statement urged the public to be as tolerant as possible with the company, pointing out the Public Service Commission's conclusion that the railway must have more revenue if it is to continue in business. Consideration for conductors was urged on the particular ground that these employees have nothing to do with fixing the fare increase. In view of the complications of the system it was noted that some changes might be required in the rates and service as determined by experience, but in general the new plan received the commendation of the chamber.

A most satisfactory state of good feeling appears to have been maintained between the public authorities and the company since the beginning of this year's fare proceedings. But there is no question that the willingness of the public to give the 6-cent fare and ticket arrangements on the Bay State system a satisfactory trial has already been increased by the company's straightforward publicity.

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## Court Sustains Higher Fares

### Connecticut Judge Holds that Waterbury Company Is Justified in Discontinuing Sale of Reduced Fare Tickets

IN a decision rendered in the Superior Court, New Haven County, in the case of City of Waterbury, *vs.* Connecticut Company on Aug. 3, Judge Gager dissolved the injunction which he himself had granted on July 27 restraining the company from discontinuing the sale of tickets at six for 25 cents or twenty-five for $1 in Waterbury, Conn., until after an investigation and decision by the Public Utilities Commission.

In his decision Judge Gager says that the State law permits a public utility to raise or lower its rates provided the rates thus established are reasonable, except where the Public Utilities Commission has established a rate. In such a case the company must first apply to the commission to review its rate as to its reasonableness, and any city or any ten patrons of any public utility have the same privilege of requesting a review. The ticket rate in Waterbury was established by the company voluntarily when the road was operated by horses to encourage traffic, and the company was not bound by any contract, charter obligation or other undertaking to continue it. Continuing, the court said "because rates may be raised means nothing if the former rate was special or preferential," and quoted in support of this decision Myers *vs.* Pennsylvania Company, 2 I. C. R., page 403, and Interstate Commerce Commission *vs.* Chicago G. W. R. Company, 209 U. S., 108, L. Ed., Vol. 52, page 705. In this latter case the United States Supreme Court said:

"Undoubtedly when rates are changed the carrier making the change must, when properly called upon, be able to give a good reason therefor, but the mere fact that a rate has been raised carries with it no presumption that it was not rightfully done. Those presumptions of good faith and integrity which have been recognized for ages as attending human action have not been overthrown by any legislation in respect to common carriers."

The Connecticut court then reviews the testimony presented by the company on the increased cost of providing the service and concludes: "It is difficult to see when an increase demanded and granted as necessary everywhere else is not equally necessary in the street railway business. The great advance in all the necessaries of railroading must be paid by the company, and what was a sufficient income a year ago may be insufficient now."

## Massachusetts Fare Cases

### Commission Is Active in Fare Matters—Is Sitting Practically Every Week on Pending Cases Concerning Various Railways

ELECTRIC railway revenue cases at present constitute the most important business before the Massachusetts Public Service Commission, and that body is sitting upon these matters practically every week. The board will consider in the near future the question of higher interurban fares on the Bay State Street Railway, Boston, and it is required to present to the next Legislature a report on the Boston Elevated Railway's finances with recommendations as to their betterment.

Hearings have been concluded on the fare petitions of the Middlesex & Boston Street Railway and the Norton, Taunton & Attleboro Street Railway. The proposed increase in the latter case has been suspended until Sept. 1, while in the former the board has approved a six months' trial of a compromise fare increase plan agreed upon by the company and by representatives of many of the more important municipalities which it serves. Arguments in the Boston & Worcester Street Railway fare case were heard on July 18 and 25, as noted more in detail elsewhere in this issue, the board having suspended until Sept. 1 the proposed installation of a zone system based on mile-post divisions.

The Holyoke Street Railway fare case is still before the board, although a decision may be expected soon. With the filing of a fare increase petition last week by the Springfield Street Railway, all the larger systems of the State, except that at Worcester, have appealed to the commission for relief. Meanwhile a general investigation of electric railway finances is being conducted by a legislative recess commission.

## Six-Cent Fare for Nashua Lines of Bay State Company

### New Hampshire Commission Approves Establishment of Six-Cent Fare in Nashua District—Changes in Transfer Arrangements Also Provided For

THE New Hampshire Public Service Commission has issued a finding approving the establishment of a 6-cent fare unit on the lines of the Bay State Street Railway in the Nashua district. The ruling makes the new rates permanent instead of provisional, as is the case for six months on the urban lines of the company in Massachusetts. Before the decision was reached, an agreement was made between representatives of the municipalities of Nashua and Hudson, N. H., and the company for the institution of the new rates.

As in the recent case before the Massachusetts commission, the new fare unit will be accompanied by the sale of tickets at the rate of twenty for $1, each ticket being good for one unit cash fare on the Nashua lines when presented with cover of the same number, except Saturdays after 1 p. m. and on Sundays and legal holidays. All reduced rate tickets except school tickets are to be withdrawn, the latter being sold at one-half the regular rates. Various local changes in transfer arrangements are established.

Under the new schedule the maximum increase will be from 10 to 18 cents on the run from the Nashua transfer limit to the New Hampshire-Massachusetts line, a distance of 7.86 miles. The rate per mile on through fares will range from 1.63 to 4.61 cents, and on local fares from 0.749 cent to 2.35 cents. On cars operated by agreement with the Manchester & Nashua Street Railway from Derry Lane to Nashua transfer station, the present 5-cent fare will remain pending the settlement of a subsequent petition.

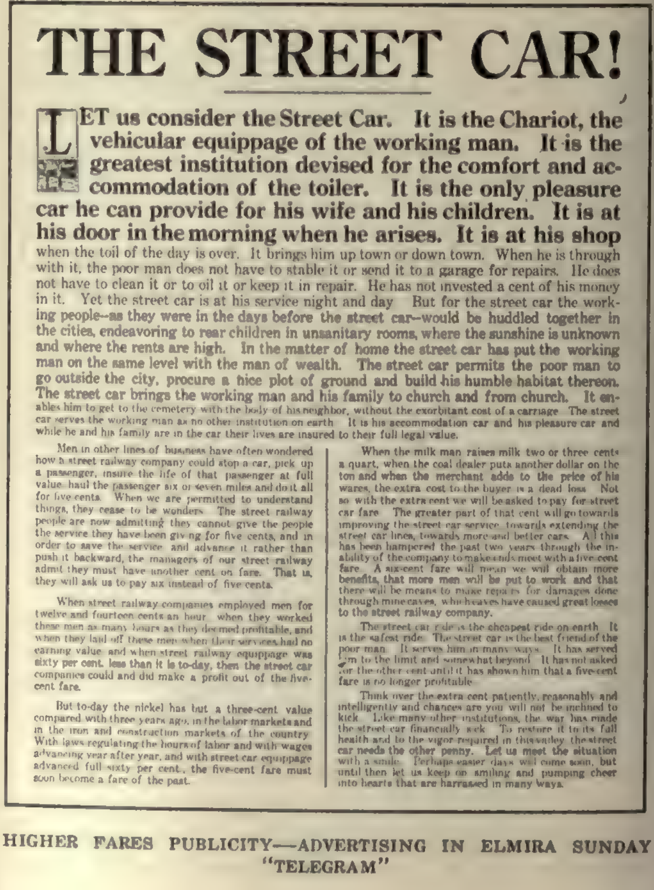
## Publicity on Higher Fares

### Two Exhibits Showing How the Need of Higher Fares Is Being Explained to the Public

MOST of the electric railways which are asking for higher fares are telling the story of their need for it to the public. Some of this publicity as issued in Brooklyn and elsewhere has been mentioned in this paper. Other forms of publicity are shown herewith.

The first of these is a page advertisement published in the Scranton edition of the Elmira *Telegram* for Sunday, Aug. 5.

The second exhibit is the first and third pages of a two-page leaflet, distributed by the Eastern Pennsylvania Railways Company of Pottsville, Pa. It forms



THE STREET CAR!

**LET us consider the Street Car. It is the Chariot, the vehicular equippage of the working man. It is the greatest institution devised for the comfort and accommodation of the toiler. It is the only pleasure car he can provide for his wife and his children. It is at his door in the morning when he arises. It is at his shop** when the toil of the day is over. It brings him up town or down town. When he is through with it, the poor man does not have to stable it or send it to a garage for repairs. He does not have to clean it or to oil it or keep it in repair. He has not invested a cent of his money in it. Yet the street car is at his service night and day But for the street car the working people--as they were in the days before the street car--would be huddled together in the cities, endeavoring to rear children in unsanitary rooms, where the sunshine is unknown and where the rents are high. In the matter of home the street car has put the working man on the same level with the man of wealth. The street car permits the poor man to go outside the city, procure a nice plot of ground and build his humble habitat thereon. The street car brings the working man and his family to church and from church. It enables him to get to the cemetery with the body of his neighbor, without the exorbitant cost of a carriage The street car serves the working man as no other institution on earth It is his accommodation car and his pleasure car and while he and his family are in the car their lives are insured to their full legal value.

Men in other lines of business have often wondered how a street railway company could stop a car, pick up a passenger, insure the life of that passenger at full value haul the passenger six or seven miles and do it all for five cents. When we are permitted to understand things, they cease to be wonders The street railway people are now admitting they cannot give the people the service they have been giving for five cents, and in order to save the service and advance it rather than push it backward, the managers of our street railway admit they must have another cent on fare. That is, they will ask us to pay six instead of five cents.

When street railway companies employed men for twelve and fourteen cents an hour when they worked these men as many hours as they deemed profitable, and when they laid off these men when their services had no earning value and when street railway equippage was sixty per cent. less than it is to-day, then the street car companies could and did make a profit out of the five-cent fare.

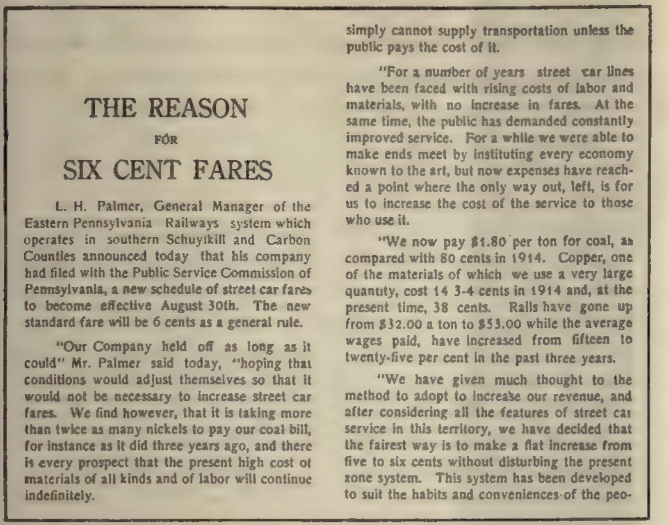
But to-day the nickel has but a three-cent value compared with three years ago, in the labor markets and in the iron and construction markets of the country With laws regulating the hours of labor and with wages advancing year after year, and with street car equippage advanced full sixty per cent., the five-cent fare must soon become a fare of the past.

When the milk man raises milk two or three cents a quart, when the coal dealer puts another dollar on the ton and when the merchant adds to the price of his wares, the extra cost to the buyer is a dead loss Not so with the extra cent we will be asked to pay for street car fare The greater part of that cent will go towards improving the street car service towards extending the street car lines, towards more and better cars All this has been hampered the past two years through the inability of the company to make ends meet with a five cent fare A six-cent fare will mean we will obtain more benefits, that more men will be put to work and that there will be means to make repairs for damages done through mine caves, which caves have caused great losses to the street railway company.

The street car ride is the cheapest ride on earth It is the safest ride The street car is the best friend of the poor man It serves him in many ways It has served him to the limit and somewhat beyond It has not asked for the other cent until it has shown him that a five-cent fare is no longer profitable

Think over the extra cent patiently, reasonably and intelligently and chances are you will not be inclined to kick Like many other institutions, the war has made the street car financially sick To restore it to its full health and to the vigor required in this valley the street car needs the other penny. Let us meet the situation with a smile Perhaps easier days will come soon, but until then let us keep on smiling and pumping cheer into hearts that are harrassed in many ways.

HIGHER FARES PUBLICITY—ADVERTISING IN ELMIRA SUNDAY "TELEGRAM"



THE REASON

FOR

SIX CENT FARES

L. H. Palmer, General Manager of the Eastern Pennsylvania Railways system which operates in southern Schuylkill and Carbon Counties announced today that his company had filed with the Public Service Commission of Pennsylvania, a new schedule of street car fares to become effective August 30th. The new standard fare will be 6 cents as a general rule.

"Our Company held off as long as it could" Mr. Palmer said today, "hoping that conditions would adjust themselves so that it would not be necessary to increase street car fares. We find however, that it is taking more than twice as many nickels to pay our coal bill, for instance as it did three years ago, and there is every prospect that the present high cost of materials of all kinds and of labor will continue indefinitely.

simply cannot supply transportation unless the public pays the cost of it.

"For a number of years street car lines have been faced with rising costs of labor and materials, with no increase in fares. At the same time, the public has demanded constantly improved service. For a while we were able to make ends meet by instituting every economy known to the art, but now expenses have reached a point where the only way out, left, is for us to increase the cost of the service to those who use it.

"We now pay $1.80 per ton for coal, as compared with 80 cents in 1914. Copper, one of the materials of which we use a very large quantity, cost 14 3-4 cents in 1914 and, at the present time, 38 cents. Rails have gone up from $32.00 a ton to $53.00 while the average wages paid, have increased from fifteen to twenty-five per cent in the past three years.

"We have given much thought to the method to adopt to increase our revenue, and after considering all the features of street car service in this territory, we have decided that the fairest way is to make a flat increase from five to six cents without disturbing the present zone system. This system has been developed to suit the habits and conveniences of the peo-

HIGHER FARES PUBLICITY—PAGES FROM POTTSVILLE LEAFLET

part of a publicity campaign conducted by that company and including leaflets, newspaper advertisements, cards in the cars, notices to employees, etc.

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# General Evidence Presented at Albany

## Up-State New York Railways Show Increased Costs of Operation and Financial Condition—Commission Reserves Ruling on Franchise Fare Restrictions

THE hearings before the Public Service Commission for the Second District of New York on the applications of the twenty-eight electric railways for permission to increase passenger fares were resumed at Albany on Aug. 7. The petitions of these companies were made under the auspices of the special committee on ways and means to obtain additional revenue of the New York Electric Railway Association. Petitions were also filed independently by three other lines in New York State, the hearings on which were begun on July 25, as noted in the ELECTRIC RAILWAY JOURNAL of July 28.

At the hearing this week the evidence presented was general in scope, covering the present situation in which all the twenty-eight petitioners find themselves. Municipal representatives argued that no general testimony should be admitted, but the commission ruled that the railways might introduce their case in this way. Corporation Counsel Richard C. S. Drummond of Auburn, representing the committee composed of the different corporation counsels of the State, appeared in opposition to the applications, and Charles E. Hotchkiss, New York, appeared as counsel for the committee representing the railways.

### HOW COSTS HAVE GONE UP

In order to show the advance in prices of labor, material and equipment and the general expense of operation, testimony was presented by various experts from manufacturing companies. For example, Edmund P. Waller, assistant manager of the railway department of the General Electric Company, and Roscoe Seybold, of the Westinghouse Electric & Manufacturing Company, testified that all kinds of electric apparatus used by electric railways now costs, on account of increased prices of labor and materials, from 50 to 125 per cent more than in 1914. Labor costs in the production of these supplies have advanced from 30 to 40 per cent since 1914. Steel plates have increased in cost as much as 700 per cent; copper, 120 per cent; steel castings, 100 per cent; steel forgings, 340 per cent; coal, 80 per cent; brass, 200 per cent, etc.

W. G. Kaylor, of the Westinghouse Traction Brake Company, stated that since April, 1917, air brake equipment has increased 27 per cent in price, and James S. Thompson, vice-president of the American Brake Shoe & Foundry Company, testified to a 63 per cent increase in cost of brake shoes. Wm. H. Englund, of the Electric Service Supplies Company, said that trolley wire insulators, etc., have increased 200 per cent in the last three years, owing to increased costs of labor and material.

### HIGH LABOR COSTS AND FINANCIAL BURDENS

Prof. Roswell C. McCrea, of Columbia University, testified that labor costs had increased greatly in the last three years, and declared it practically a certainty that still more increases are near at hand. Professor McCrea presented tables showing the rise in wages in recent years.

Prof. Thomas Conway, Jr., of the Wharton School of Finance, University of Pennsylvania, submitted a statement and exhibits, based on reports to the Public Service Commission, to the effect that more than one-half of the petitioning companies were not only paying no dividends but were not even earning the interest on their bonds. Professor Conway stated that the net corporate income of twenty-seven of the twenty-eight companies, despite an increase of total business, had fallen from $1,143,294 in 1912 to $423,711 in 1916. Only seven companies showed an increase in net since 1912. Fourteen companies failed to earn their fixed charges in 1916.

Professor Conway testified that only three of the companies had income enough to enable them to market their securities. He stated that even a 6-cent fare would not make up for the loss of purchasing power of the nickel in buying of supplies for electric railways. Unless relief were granted sufficient to make the industry attractive to investors, the companies could not keep up service, buy cars or other equipment, or extend lines, and some would have to go into receivership.

### COMMISSION REFUSES TO RULE IN ADVANCE ON JURISDICTION

Mr. Drummond endeavored at the beginning of the hearing to secure a ruling on the right of the commission to grant an increase in fares in special cases where charters and franchises imposed 5-cent fare limits upon the companies. Chairman Van Santvoord answered that the commission was not going to decide this question in advance; that the statute gives the commission the right to make the inquiry now under way, and that the commissioners purposed to go ahead with the taking of testimony and not to enter into an argument about the decision of legal questions. Chairman Van Santvoord said that Mr. Drummond and his associates could file objections. As noted in the issue of July 21, the commission had previously ruled that it had power to grant increases in cases not involving alleged charter or franchise restrictions.

In commenting upon the present ruling, the city representatives later gave out a statement in part as follows:

"If the commission had ruled that it had no jurisdiction in such cases, several of the petitions would be thrown out, and the cities involved would not have to go to the expense of engaging experts and preparing to combat the claims of the companies. As the commission denied this request, it now becomes necessary for all cities, even though the commission's jurisdiction in certain cases in which several cities are involved has not yet been determined, to go to expense and trouble of preparing to oppose the petitions of the companies.

"We objected to taking general testimony alleged to be applicable to all cases. After this had been overruled, we requested that at the conclusion of the general testimony the commission take up the trial of the case to be designated by us, as involving all the questions desired to be reviewed.

"The commission at first refused this request, stating that it would determine for itself what cities should be considered first. At the close of the day the commission stated it would consent to receive a suggestion from the cities. We have decided to suggest Schenectady, as all the questions of jurisdiction are involved, and every question the commission will have to pass on will be decided in that one case."

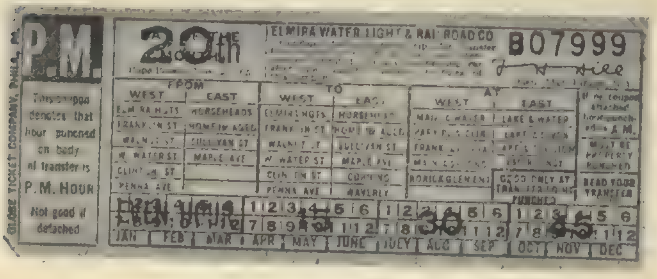
## A Simple and Effective Transfer

BY C. A. KOLSTAD

Secretary and Treasurer Elmira Water, Light & Railroad Company

We think that we have adopted a transfer that is very simple and effective and therefore that it will be of interest to other utility operators.

On account of the closeness of the various transfer points on our lines our transfers must indicate very clearly the intersection point where they are to be used.



NEW TRANSFER AT ELMIRA

We therefore arranged our lines and transfer points in geographical order. This makes them easily readable by both the passenger and conductor, thus reducing friction from wrong punching.

As we do not print in the year, returned transfers can be used over each month, thus reducing the waste. To prevent passengers saving transfers and using them on the same day the following month, different colors are used each month besides the punch mark for the month. As the month and issuing line can be punched ahead, only three punches are required when the transfer is issued to the passenger.

We realize enough from the sale of the back for advertising to pay the entire cost of printing our transfers.

## A Spelling "Bee" on Trainmen's Rules

### Great Interest and Proficiency in Rule Book Stimulated by Inter-Divisional Contests

A MEANS of inducing the trainmen to read their rule books instead of forcing them to do so has been meeting with great success in the Denver Tramway Company. This comprises what in effect is an old-fashioned spelling "bee" at the monthly meeting of the Denver Tramway Brotherhood, with the rules of the transportation department as the point of contest, instead of spelling. This contest has come to be one of the features of these monthly meetings and has proved as entertaining to all the employees as it is keenly interesting to the trainmen. The manner in which the contest is arranged is as follows:

For the contest each month the four division superintendents of the company each appoint eight conductors and eight motormen to represent their division in the next rule book spelling bee. These sixteen men then begin in earnest to study the rule book, and usually they appoint a trainer who gets the men together periodically in the club room and asks them questions. Thus on the four divisions there are sixty-four men each month who are making a special drive on the company rule book. Then two days previous to the contest, the names of the two motormen and two conductors who are to represent each division in the contest are drawn by lot from the group of sixteen. At the contest, the general attorney for the company acts as chairman of the meeting, while the transportation department instructor puts the questions to the sixteen men from the four four divisions. One of the company department heads acts as scorekeeper, and the claim agent who is also in charge of safety work, the superintendent of transportation and the publicity manager act as judges. The team winning the highest score is given a prize of $10, with a second prize of $5. The prizes, of course, are divided equally among the four members of the winning teams.

In addition to affording a lot of good fun, these contests have brought out many interesting facts. The questions asked are confined not only to the rule book, but also include the locations of all the principal buildings and institutions, parks, clubs, etc., and what car to take to reach them. It is on some of these latter questions that some of the oldest men in the company have fallen down. The losing teams in the contest thus far have shown a very excellent spirit, and instead of being greatly disappointed have declared they would get the money next time.

In selecting the sixteen men to represent their divisions the division superintendents are required to appoint no man who has been in any former contest. This insures that the group of sixty-four men in training on the system each month will gradually take in new men, so that in the course of about six months all the trainmen on the system will know the rules better than ever before. As none of the group of sixteen on each division each month knows who will be drawn for the final contest, it keeps them all "plugging" until within two days of the monthly brotherhood meeting. The spirit with which the men have entered into this contest and the very marked results which are being obtained have been a revelation to the company officials. The idea was introduced by J. C. Davidson, publicity manager.

# Analysis of the Power Sources of Electric Railways

### Figures Show That 55 Per Cent of Companies Generate Their Power and That These Companies Operate 68 Per Cent of the Mileage and Own 70 Per Cent of the Cars in the Country

Owing to the interest in the subject of energy purchase and sale by railways, the following tables have been compiled for the purpose of investigating the present status of this business. The figures are based on those in the *McGraw Electric Railway Directory* for August, 1916. On account of the complicated organization of many companies estimates had to be made in certain cases so that the figures are only approximate, but it is thought that the tables will prove useful.

Table I—Power Sources of Electric Railways

| Territory, State or Country | Total Number | Number of Companies with Power Load | Number of Companies with Lighting Load | Companies Generate Power | Companies Purchase Power | Companies Generate and Purchase | Mileage of Generating Companies | Mileage of Purchasing Companies | Number of Cars of Generating Companies | Number of Cars of Purchasing Companies |
|---|---|---|---|---|---|---|---|---|---|---|
| Alabama | 13 | 6 | 6 | 6 | 8 | 1 | 251.7 | 108.6 | 506 | 170 |
| Arizona | 4 | 0 | 2 | 1 | 3 | 0 | 6.7 | 45 | 10 | 37 |
| Arkansas | 10 | 4 | 5 | 5 | 5 | 0 | 96.6 | 29.5 | 200 | 87 |
| California | 40 | 3 | 3 | 12 | 30 | 2 | 340 | 2,924.5 | 577 | 5,577 |
| Colorado | 12 | 3 | 1 | 6 | 7 | 1 | 355.4 | 86.9 | 628 | 54 |
| Connecticut | 20 | 1 | 1 | 11 | 9 | 0 | 788 | 222 | 1,703 | 384 |
| Delaware | 2 | 1 | 0 | 1 | 2 | 1 | 136 | 17 | 371 | 18 |
| Dist. of Columbia | 7 | 2 | 1 | 4 | 3 | 0 | 399.7 | 11.9 | 1,382 | 7 |
| Florida | 9 | 4 | 4 | 8 | 1 | 0 | 167.1 | 26.1 | 277 | 30 |
| Georgia | 13 | 5 | 6 | 9 | 7 | 3 | 409.5 | 56.1 | 692 | 84 |
| Idaho | 6 | 1 | 1 | 1 | 5 | 0 | 58 | 121.7 | 20 | 69 |
| Illinois | 70 | 10 | 11 | 29 | 42 | 1 | 1,952 | 1,692.9 | 3,566 | 4,333 |
| Indiana | 48 | 11 | 12 | 31 | 17 | 0 | 2,462 | 359.2 | 2,116 | 459 |
| Iowa | 28 | 11 | 14 | 19 | 9 | 0 | 528.4 | 207.3 | 987 | 343 |
| Kansas | 19 | 3 | 5 | 11 | 8 | 0 | 294.5 | 253.8 | 212 | 305 |
| Kentucky | 10 | 1 | 2 | 7 | 3 | 0 | 448.6 | 14.5 | 1,071 | 41 |
| Louisiana | 10 | 1 | 6 | 10 | 0 | 0 | 327.2 | 0.0 | 820 | 0 |
| Maine | 14 | 5 | 5 | 9 | 5 | 0 | 498.1 | 57 | 712 | 85 |
| Maryland | 10 | 3 | 2 | 4 | 6 | 0 | 513.5 | 153.1 | 2,233 | 181 |
| Massachusetts | 43 | 4 | 2 | 25 | 19 | 1 | 2,735.2 | 506 | 7,814 | 581 |
| Michigan | 27 | 5 | 6 | 18 | 12 | 3 | 890 | 774 | 1,734 | 1,063 |
| Minnesota | 11 | 1 | 2 | 4 | 7 | 0 | 457.9 | 165.8 | 1,140 | 197 |
| Mississippi | 11 | 5 | 10 | 11 | 0 | 0 | 123.1 | 0 | 191 | 0 |
| Missouri | 22 | 2 | 6 | 16 | 7 | 1 | 609.5 | 547.5 | 1,362 | 1,645 |
| Montana | 8 | 0 | 2 | 2 | 7 | 1 | 0 | 271.1 | 0 | 1,136 |
| Nebraska | 6 | 2 | 2 | 2 | 4 | 0 | 223.3 | 31.1 | 582 | 26 |
| Nevada | 2 | 0 | 0 | 0 | 2 | 0 | 0 | 10.8 | 0 | 12 |
| New Hampshire | 12 | 1 | 1 | 6 | 6 | 0 | 97.7 | 78.3 | 137 | 106 |
| New Jersey | 29 | 1 | 1 | 20 | 9 | 0 | 1,246 | 73.7 | 2,633 | 99 |
| New Mexico | 2 | 1 | 1 | 1 | 1 | 0 | 3.7 | 5 | 5.5 | 6 |
| New York | 98 | 12 | 14 | 45 | 56 | 3 | 3,416 | 2,219.1 | 13,315 | 4,378 |
| North Carolina | 13 | 6 | 7 | 7 | 7 | 1 | 112.7 | 177 | 240 | 286 |
| North Dakota | 4 | 1 | 1 | 2 | 2 | [illegible] | 3 | 4 | 24 | 67 |
| Ohio | 77 | 20 | 27 | 53 | 24 | 0 | 3,895.7 | 478 | 6,821 | 374 |
| Oklahoma | 16 | 3 | 3 | 7 | 9 | 0 | 199.4 | 129.5 | 193 | 194 |
| Oregon | 9 | 1 | 1 | 5 | 4 | 0 | 375.4 | 354.8 | 1,222 | 306 |
| Pennsylvania | 123 | 4 | 9 | 63 | 63 | [illegible] | 2,625.6 | 1,844.5 | 5,078 | 4,248 |
| Rhode Island | 3 | 1 | 1 | 2 | 1 | 0 | 423.6 | 14.5 | 1,343 | 13 |
| South Carolina | 6 | 3 | 3 | 4 | 2 | 0 | 95.1 | 14.8 | 154 | 20 |
| South Dakota | 3 | 0 | 0 | 0 | 3 | 0 | 0 | 96 | 0 | 33 |
| Tennessee | 14 | 3 | 4 | 5 | 9 | 0 | 295.9 | 205.3 | 755 | 182 |
| Texas | 38 | 4 | 5 | 14 | 24 | 0 | 424.4 | 316.2 | 821 | 620 |
| Utah | 5 | 0 | 0 | 0 | 5 | 0 | 0 | 425 | [illegible] | 970 |
| Vermont | 10 | 1 | 2 | 4 | 6 | 0 | 57 | 67.8 | 102 | 40 |
| Virginia | 18 | 2 | 5 | 14 | 5 | 1 | 487.5 | 41.1 | 977 | 66 |
| Washington | 18 | 6 | 10 | 13 | 5 | 0 | 1,154.6 | 98 | 1,800 | 136 |
| West Virginia | 21 | 8 | 7 | 14 | 10 | 0 | 357.7 | 94 | 599 | 62 |
| Wisconsin | 22 | 9 | 8 | 15 | 7 | 0 | 714 | 51.2 | 994 | 102 |
| Wyoming | 2 | 0 | [illegible] | 0 | 2 | 0 | 0 | 22 | [illegible] | 22 |
| Canada | 62 | 12 | 15 | 34 | 28 | 0 | 1,565.5 | 731.5 | 3,915 | 1,556 |
| Hawaii | 1 | 0 | 0 | 1 | 0 | 0 | 30 | 0 | 72 | [illegible] |
| Mexico | 14 | 6 | 8 | 12 | 2 | 0 | 385.5 | 37.2 | 998 | [illegible] |
| West Indies | 7 | 3 | 6 | 7 | 0 | 0 | 238.9 | 0 | 853 | 0 |
| Philippine Islands | 1 | 0 | 1 | 1 | 0 | 0 | 53.9 | 0 | 141 | 0 |
| Porto Rico | 2 | 1 | 1 | 2 | 0 | 0 | 17.7 | 0 | 133 | 0 |
| Totals | 1108 | 203 | 261 | 613 | 518 | 23 | 33,323.5 | 16,272.2 | 74,371 | 30,906 |

18.5 per cent of companies have power load.
23.6 per cent of companies have lighting load.
54.3 per cent of companies generate their power.
45.7 per cent of companies purchase their power.
2.08 per cent of companies both generate and purchase their power.
67.3 per cent of mileage is operated by generated power.
32.7 per cent of mileage is operated by purchased power.
70.6 per cent of cars are operated by generated power.
29.4 per cent of cars are operated by purchased power.

Table II—Railroads Operating Electric Divisions

| Name and Division | Purchase Power | Generate Power | Motor Cars | Locomotives | Miles |
|---|---|---|---|---|---|
| Balto. & Ohio, Belt Div. | P | .. | .. | 9 | 8.4 |
| Boston & Maine, in New Hampshire | .. | G | 37 | .. | 30.72 |
| Boston & Maine, in Mass. | P | .. | .. | 5 | 22 |
| Bush Terminal R. R. | P | .. | 2 | 3 | 6 |
| Chicago, Milwaukee & St. Paul. | P | .. | .. | 44 | 440.6 |
| Erie R. R., Rochester Div. | P | .. | 8 | .. | 40 |
| Grand Trunk, St. Clair Tun. | .. | G | .. | 6 | 12 |
| Great Northern Ry., Cascade Tunnel | P | .. | .. | 4 | 10 |
| Long I. R. R., Electric Div. | P | .. | 591 | .. | 217.2 |
| N. Y., N. H. & H., all electrified divisions | P | G | 25<br>44* | 100 | 570 |
| N. Y. C. & H. R., Elec. Div. | .. | G | 192*<br>19* | 63 | 254.6 |
| Norfolk Southern R. R., Va. Beach Div. | .. | G | 25<br>17* | 1 | 47 |
| Norfolk & Western Ry. | .. | G | 12 | .. | 88.8 |
| Penn. R. R., Paoli Div. | P | .. | 93 | .. | 96.6 |
| Penn. Tunnel & Terminal Co. | .. | G | 68 | 66 | 95.5 |
| West Jersey & Seashore R. R. | .. | G | 109 | .. | 150.3 |

*Trailers.

Table I embraces all street railways and interurban lines, including storage-battery lines, but excludes gas electric lines, auto bus lines, horse car lines and inclined cable roads. Table II includes those roads which were originally steam roads but have since been electrified or which operate electric divisions. As the tables are intended to represent passenger roads, a few roads built primarily for the transportation of freight, such as the Chicago Tunnel Company, which operates 61 miles of narrow-gage subway lines and owns 132 motor cars and 3000 other cars, were excluded. In a good many instances where companies, such as the Detroit United Railway, generate part of their load and purchase the remainder, the figures on cars have been prorated according to the amounts generated or purchased by these companies.

Railways in Table I, which obtain their power from another sub-company of the same corporation like the Public Service Corporation of New Jersey, are classified as generating their power but not as carrying a lighting or power load, but where the operating company is both a lighting and a railway company, like the Milwaukee Electric Railway & Light Company, it is classified as generating its power and also having a lighting load. It was somewhat difficult to determine just which roads should be included in the electrified group, but for the purpose of this study only those appearing in Table II have been so designated.

From this classification it appears that about 18 per cent of the electric railway companies in this country are doing a supplementary industrial power business and 24 per cent a lighting business. Of those which either generate or purchase power, 55 per cent belong in the generating group and 45 per cent in the purchasing group; 2 per cent of the total number both generate and purchase. Approximately 68 per cent of the mileage and 70 per cent of the rolling stock are owned by railways generating their power.

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There were 891 collisions between automobiles and electric cars on the Detroit United system during May of this year. This is an average of almost twenty-nine per day or more than one for every mile of track, including yard trackage. As a result of these collisions 150 claims for damages were made against the company. These figures were recently presented to the Detroit public through *Electric Railway Service*, the company's publication in an article urging greater care.

# COMMUNICATIONS

## Publicity and the Association

SOUTHERN PUBLIC UTILITIES COMPANY
CHARLOTTE, N. C., Aug. 7, 1917.

To the Editors:

A communication from W. F. Brashears, director of the Public Utility Publicity Bureau of Chicago, in your issue of July 28, under the heading: "The Privately Conducted Publicity Bureau," has come to my desk, and by reason of the fact that he quotes from a prior communication from the writer and because of the fact that his argument begins at the point mine starts, I am presuming upon the charity of the ELECTRIC RAILWAY JOURNAL for a bit of space.

If company publications were issued solely for the men employed by these companies, it is possible that the argument of the Chicago gentleman would hold, but that has long since been proven to be a single barreled gun. The more successfully operated publicity departments reach the public which compose the patronage, real or potential, as well as the employees, and again I submit that varying conditions make it impossible for a general publication to fill the needs of any appreciable number of localities or sections.

Mr. Brashears is happy, I think, in the selection of his comparison of the publicity bureau with the central station or a single electric railway company for a given city. But from that point his argument is faulty. It is my opinion, and has always been, that the central station idea is the proper one, and that the publicity bureau within the American Electric Railway Association is that central station. I agree with Mr. Brashears that a multiplicity of such stations would not operate to the best advantage of the industry.

But I am convinced, after a careful study of his communication, that the gentleman has confused the issue and is arguing against a central association publicity *bureau* when he probably means to advocate the establishment of a central *printing house*. I submit there is a wide difference between the two, and though he fears that the creation of the former would interfere with his business and that it would be unfair and unwarranted, I fail to see that an Association bureau for the dissemination of useful information, much of which would not be for publication, would interfere in any way with the publication of even a general bulletin or magazine such as he issues now for so many electric railways.

I want to be entirely fair to Mr. Brashears and therefore I am going to admit that the publication of a general bulletin for the small company, employing, as he says, twenty-five or thirty men, would and probably is, serving a most excellent purpose. Manifestly it would not be economical for a company of that size to operate an independent publicity bureau, and when this type of companies is being considered I want to admit that the general publishing house would be a valuable factor in the publicity field.

I want to admit, also, that inspirational articles are as valuable in one section as another, yet I find that even these are more forceful if they are adapted to the conditions prevailing in the various sections. Ministers of the gospel do not preach Christ and Him crucified in exactly the same words to every congregation, owing to the different composition of congregations, and a thought expressed in different phraseology reaches the people with much greater force than the thought presented time after time in the same language. Thus it is, that a thought which appeals to the employees of a company and the public of one section when presented according to one set and specific school, will fail of its purpose in some other section.

In conclusion, I want to say that my purpose in writing the JOURNAL, in the first instance, was to bring out a full and free discussion of this most important matter, and I am more than delighted with results. Because publicity men fail to agree on all points is no argument against their respective schools or lines of action. But in the multiplicity of counsel there is wisdom, and I believe too much time, effort and space can not be devoted to the subject under discussion.

LEAKE CARRAWAY, Director of Publicity.

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UNITED RAILWAYS & ELECTRIC COMPANY
BALTIMORE, MD., Aug. 6, 1917.

To the Editors:

*In re* the much mooted question of a publicity section, permit me to say that I have read the letters of Mr. Brashears of Chicago, Mr. Carraway of Charlotte, Mr. Davidson of Denver, Mr. Van Zandt of Detroit, the Sermon on the Mount, the Message to Garcia and sundry and divers other disquisitions touchin' on and appertainin' to the pending subject. Incidentally, I have written some on the subject myself.

I am in favor of a publicity organization associated with the American Electric Railway Association but not to usurp the functions of the very excellent data bureau now maintained by the association.

The publicity organization should perform its natural functions, just as a traffic organization, a transportation organization, and all the other company organizations within the association perform their natural and self-related functions. And there should not be any great difficulty in drawing the line between the natural functions of one department and those of another.

The whole discussion only emphasizes the healthiness of the subject and the need of getting together and threshing out the whole subject. Let's mobilize.

DWIGHT BURROUGHS, Publicity Manager.

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## Water Power in Canada

A table prepared from 1915 data by Charles H. Mitchell, Ottawa, Canada, shows that even though Canada occupies second place among the countries in available water horsepower (with about 8,000,000 hp. as compared with 28,000,000 in the United States), she has developed her resources until the percentage utilized almost equals that of the United States, with more than three times the amount available. The developed horsepower per capita is three times that of the United States, and the annual rate of development in Canada is probably much more rapid. The Canadian government is supreme in matters affecting navigable rivers and exercises a firm control over them. The policy of the government, while protecting the public and insisting on economic utilization, aims at fostering legitimate private enterprise.

# EQUIPMENT and MAINTENANCE

HAVE YOU A GOOD WAY
OF DOING A JOB?
*—Pass It Along*

*Read in This Issue:*

How the Pacific Electric Railway Developed Its Mechanical Flagman

## Evolution of an Automatic Flagman

### Author Describes Experience in Developing an Electrically-Operated Automatic Flagman, at First on Lines of Pacific Electric Railway, Later as a Commercial Product

BY CLIFFORD A. ELLIOTT
Cost Engineer Pacific Electric Railway, Los Angeles, Cal.

The Pacific Electric Railway has been doing everything within its power and financial limits to eliminate grade crossings. In recent newly-constructed lines, overhead highway bridges or underground passages have been established wherever feasible. When financial conditions have not permitted the separation of grade at dangerous crossings either watchmen or electrically operated automatic flagmen have been employed.

In August, 1910, the Pacific Electric installed the first mechanical flagman, which was developed in its own signal shop. It was a motor-driven belt design, and the motor, which was protected in a cast-iron box and mounted on the post supporting the flagman, was placed in operation by trolley brush contactors. The current was relayed through control apparatus, employing the high-tension type of walking-beam relay, which was installed in a wooden box and placed on the trolley pole near the flagman post as shown in Fig. 1. The other relay box on the flagman post will be explained later. In 550-volt territory the current, after being carried through the relay, was conducted into a four-tube resistance bank of 1000 ohms resistance for each tube, one tube being for the motor and the other three for three lights. The voltage was stepped down in the resistance to 220 for both motor and lamps. Mounted on the flagman were receptacles for two white incandescent lamps, while in the center of the disk were located two red lenses, between which was placed another incandescent lamp for displaying "red" at night. The resistance bank was installed in a sheet-metal box at the top of the post (not shown in Fig. 1) or immediately below the motor. When the flagman was set in operation the motor revolved the wheel and the operating belt, thus producing an arm-like motion of the signal pendulum, and caused the bell, mounted on top of the cast-iron box containing the motor, to ring. During the day the bell furnished a good warning, while at night the illumination afforded by the electric lights, both red and white, made this signal decidedly prominent. The contactors on the ordinary lines were placed about 1200 ft. preceding the crossing, while the cut-out contactor was placed just over the crossing. The approach contactor sent the annunciation into the relay apparatus, thence through the resistance bank and into the motor of the flagman which operated until car had passed through the cut-out contactor; and then the reverse movement of the walking beam relay stopped operation.

Later in the year 1912 the construction of this flagman was taken over for further development by the Railway Specialties Company, Inc., of Los Angeles, Cal. The installation of the motor-driven belt-type flagman

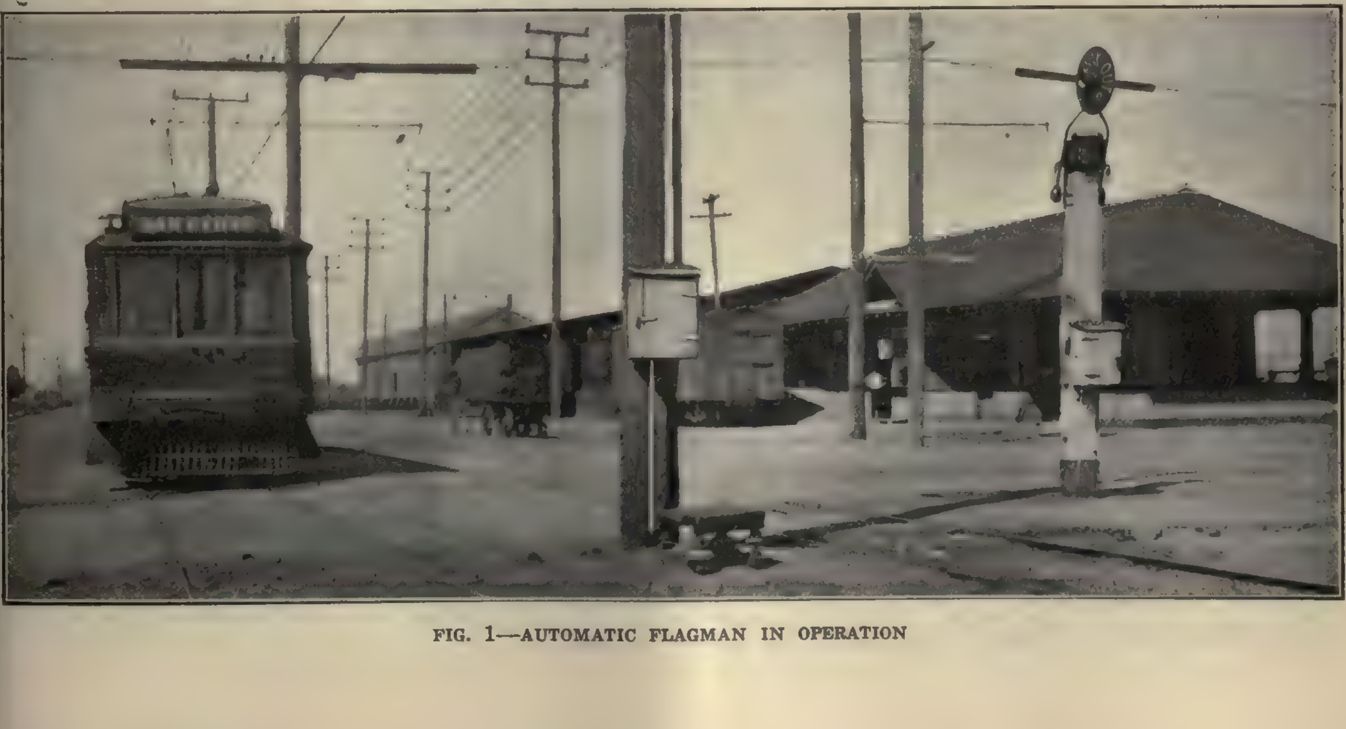


FIG. 1—AUTOMATIC FLAGMAN IN OPERATION

was discontinued and a motor-driven worm-gear type adopted, the principle of its operation, however, being practically the same as the motor-driven belt type. The Railway Specialty Company's signal was briefly described in the issue of the ELECTRIC RAILWAY JOURNAL for Jan. 23, 1915, page 176. It should be said that the flagmen of the old belt type were difficult to maintain as the belt was constantly breaking, thus greatly increasing the failures in operation. During 1916 the type was again improved by the adoption of a magnetically-operated device. This is a much better machine than the other two types formerly installed because it has no motor-driven parts. The pendulum responds more rapidly, the operations being smoother and more active, and the shaking of the machine has been minimized, thus reducing maintenance.

In the former types whenever the flagman was cut in and then cut out the pendulum would rest at its position when cut-out was effected, whereas with the magnetic type the pendulum always returns to center or is set on neutral when not in operation.

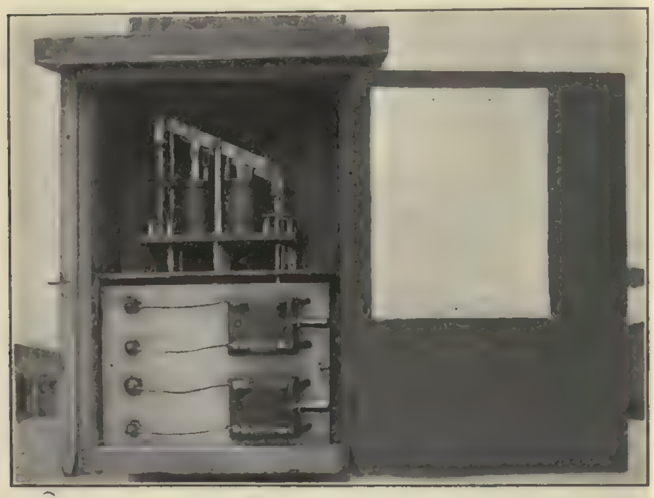


FIG. 2—HIGH TENSION WALKING BEAM RELAY AND INSPECTION CARD

## SERVICE RECORD IS CREDITABLE

Records show that excellent service is given by the latest apparatus, and in many instances more than 180,000 trains on an average have operated over a crossing before interruption occurred. Some of the signals on the four-track lines are put in operation as high as 1200 times per day. These particular lines carry from 1000 to 1200 train movements every twenty-four hours, and records show operation under such service for nine to twelve months without an interruption. The average, however, is approximately six months. Most of these failures are due to trolley brush contactor trouble, which it is anticipated can be eliminated by adoption of a track instrument to afford a more perfect contact. On some of the lines where the train operation is lighter, flagmen have seen service from sixteen months to twenty months without failure, and the total for the year of 1916 showed 193 automatic flagmen in operation, approximately eighty of which were the magnetic tyye. The records indicated that the company could operate one flagman eight months without an absolute failure.

The needed maintenance and frequent inspection of these signals have been combined by having the organization which cares for switch lights handle the maintenance of the flagmen, assigning as much territory to one man as he can efficiently handle with justice to both duties. These maintainers are provided with gasoline-motor inspection velocipedes advantageously to cover the ground, and they are required to inspect each flagman in their respective territories every day. A pasteboard card as shown in Fig. 2 is tacked on the door of the relay box at each flagman and the inspector indicates upon each daily trip the conditions noted. These cards are collected each month to permit the compiling of records of operation of the devices for the period. During the year 1916 for a period of six months there were only 185 failures, and during this same year for the twelvemonth period the cost of maintenance of one automatic flagman, including labor and material, was approximately $6 per month.

The cost of the complete installation varies according to conditions, ranging from $300 to $400 at present-day prices. The line wire used is No. 12 weatherproof iron wire, while that placed in trunking and cable is No. 14 rubber-covered double-braid copper wire. In the installation of the contactors on heavy-traffic lines, where during certain hours of the day there is as low a headway as forty-five seconds, the practice is to place three contactors 400 ft. apart, so that a train immediately preceding another will not cut the signal while the following train is approaching the crossing. The company's operating rules require at least an 800-ft. interval, in which case there is always this length of the protection in the crossing.

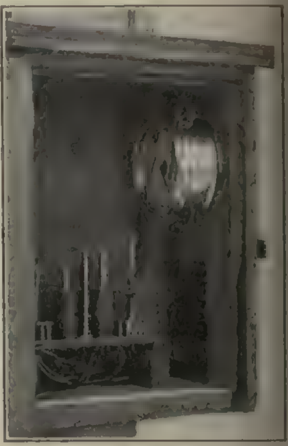


FIG. 3—CLOCK IN RELAY BOX TO EFFECT CUT-OUT AND CUT-IN OF BELL

## BELL CAN BE CUT OUT AT NIGHT

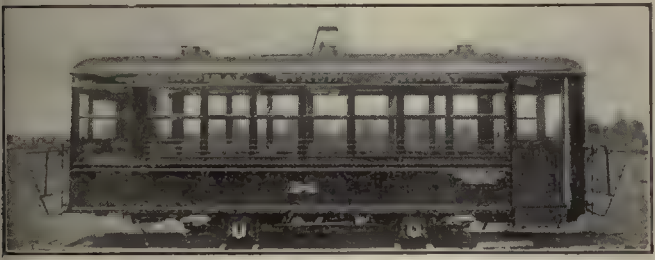
In restricted residential districts when flagmen are installed, the company in some instances agrees with residents to eliminate the bell feature. While the flagman is of some service due to its prominence and the lighting signal effect, it is not, however, at its best where the bell is eliminated. In several cases the company arranges to have the bell ringing during the daytime but cut out during the night. This can be done to good advantage in the motor-driven type, but no scheme has yet been devised for the magnetic type.

Fig. 1, in which a car is seen approaching the flagman, shows the walking-beam relay box on a trolley pole and a second walking beam relay placed in a box on the pole supporting the flagman. There is also located in this latter relay box, and opposite the walking beam relay to which it is connected by wires, an eight-day Seth Thomas clock (Fig. 3), the face and the minute hand of which are removed, while two brass stationary arms (to serve as cut-outs and cut-ins) are placed on the clock. The hour hand at 6 p. m. cuts in the relay which cuts out the bell, and at 6 a. m. this hand strikes the other stationary arm, thereby cutting in the relay which cuts in the bell again for day operation.

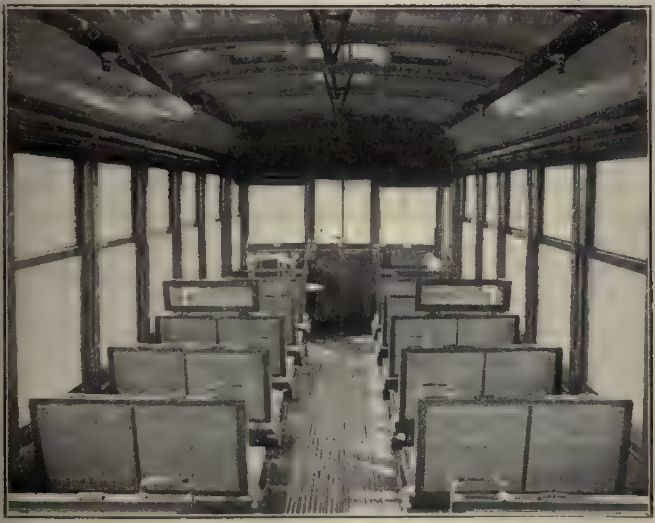
Where the flagmen are in service on the lines adjacent to the ocean the wire brushes are greatly affected by the action of the salt air and require renewal about every four months. Another disadvantage of the brush contactor is the necessity of carrying an extra man with the maintainer, to flag approaching trains while the latter is mounting the ladder to make the inspection. As already stated it is anticipated that a track contactor will be substituted for the trolley brush type.

## New Car for Louisiana Municipal Railway

New double-end, single-truck, one-man cars have recently been furnished to the Municipal Street Railway of Monroe, La. These embody a light-weight, compact design with steel underframe and side sheathing and archroof construction. The interior of the car is equipped with fourteen reversible lightweight crossseats, giving a seating capacity within the car body of twenty-eight passengers. Folding seats on the platforms provide for four additional passengers, making a total seating capacity of thirty-two.


ONE-MAN CAR BUILT FOR MONROE, LA.

The car is equipped with air brakes, manually-operated doors and two GE-506-A-2 motors. The over-bumper length is 27 ft. 9½ in. and the over-sheathing width is 7 ft. 6 in. The truck wheelbase is 8 ft. 6 in. and the wheels are of 24-in. diameter. The weight of the complete unit is 13,500 lb. The height of the step above the rail is 15 in. and the height of the car floor is 27 in. above the rail. There is no ramp in the car floor and the platform floor is on a level with the car floor. The cars were purchased from the St. Louis Car Company.


INTERIOR VIEW OF MONROE (LA.) MUNICIPAL RAILWAY'S ONE-MAN CAR

## Perpetuating the Strength of Pole Lines

### Renewal of Poles at Intervals Along Line Each Year Keeps Line Strengthened—Complete Pole Record Book Makes This Possible

BY A. SCHLESINGER

Superintendent Distribution and Substations, Terre Haute, Indianapolis & Eastern Traction Company, Indianapolis, Ind.

Maintaining the maximum strength in pole lines with a minimum expenditure is a real problem. When a pole line has been up for eleven years, with little attention, for instance, what should be done? Should the line be rebuilt or are the poles good for another ten years, and should the man responsible take a chance on having the entire line down for the sake of getting the maximum life out of the poles?

In answer to these questions the Terre Haute, Indianapolis & Eastern Traction Company has adopted the plan of reinforcing the pole lines each year by replacing poles at certain intervals. For instance, on one eleven-year-old pole line, we would renew every sixth or every ninth pole, depending upon the condition of the line, the loading, the importance, and the amount of money available for renewal. If every ninth pole was renewed and a heavy storm occurred, it would very likely take down not more than the eight intervening poles and the line would not be put completely out of commission. We aim to replace about 1000 poles a year on our various pole lines, which comprise altogether approximately 17,000 poles. This would provide a complete renewal every seventeen years, but this is not quite necessary, for many of the poles are good for a much longer period. Some have already been in service more than sixteen years and are still comparatively sound.

In our ordinary maintenance work the selection of the poles to be replaced involves a thorough inspection record used in conjunction with a pole record book. In this book the individual poles are listed in a single vertical column per page and the balance of the page utilized for columns headed for successive years. Then each year, as certain poles are renewed, a symbol which designates the type and length of pole is placed in the proper year column opposite the pole replaced. The annual inspection of the poles shows the condition of each, and this is recorded and brought into the office. Those poles in worst condition which must be renewed that year are then properly entered in the pole record book, and then the additional poles for that year's reinforcing are spaced along between these imperative replacements. From this pole record book it is thus very easy to see what poles were renewed in previous years and to fill in the spaces between renewals each successive year in the manner which will most effectively strengthen the line. By this scheme the maintenance is spread out uniformly over a long period and not a maximum but a high degree of line strength is perpetuated. With this annual reinforcing there is little danger of losing many poles at one time, and yet the replacement can be so manipulated as to get practically the full life out of the remaining old poles.

In addition to the replacements, we further strengthen the line by stubbing some of the poles with those taken down. Push braces are also set now and then, depending on the characteristics of the line. On one of the old lines where the original poles were 35 ft. in height, we replaced every other pole with a 40-ft. pole and spanned the high-tension line 200 ft., leaving only the trolley bracket fastened to the intermediate 35-ft. pole. This line will be left in this condition for approximately four years, and when the remaining 35-ft. poles are replaced with 40-ft. poles, the high-tension wire will be supported from every pole. By this scheme, instead of having a full strength line at the beginning and somewhat weakened by age at the end of the four years, we obtain a line of practically full strength throughout a period of eight years or more, and at the same time get practically the full life out of the old poles.

By this process of renewing a certain per cent of the poles each year for reinforcements, beginning at a time when indications are that poles are becoming weak, the uncertainties of inspection are largely obliterated. We frequently have poles broken off, but the line stays up due to the reinforcements, and service is not interrupted. This is the important consideration. At present we are using chestnut poles almost entirely.

## Doing Their Bit in Toledo

Like most of the other railways of the country the Toledo Railways & Light Company have met with troublous times in trying to keep their operating forces recruited to normal peace strength. This has been particularly true relative to the common labor needed for the maintenance of way and equipment. The women shown in the accompanying illustration are members of a crew of women car cleaners recently employed by the company in an effort to combat the labor scarcity problem. At present men are employed for the heavier work such as carrying water and manipulating the vacuum cleaner. The men work nine hours per day and the women nominally work eight hours, although because of the exigencies of the rush-hour car schedules their actual working time is nearer seven and a half hours per day. The women are paid 1 cent per hour less than the men. They say that they prefer the work to similar work in hotels, stores, office buildings and dwellings, and they take great pride in turning out well-cleaned cars. The cars are cleaned on the average once in eight days.

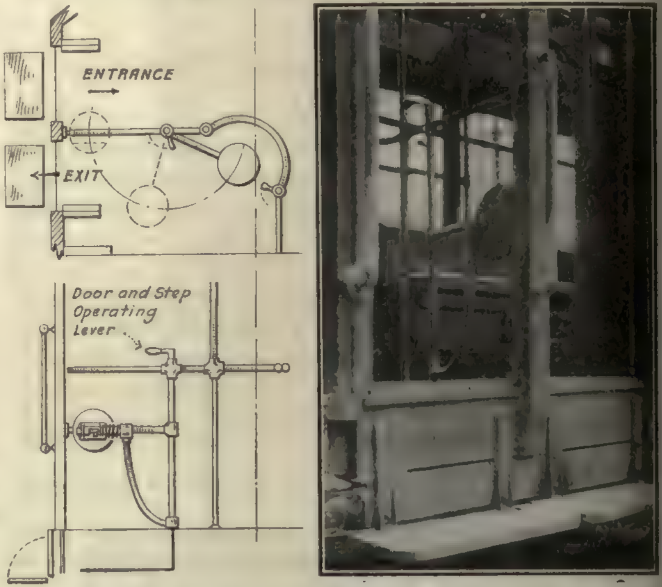
WOMEN CAR CLEANERS, TOLEDO, OHIO

## Convenient Type of Conductor's Seat

BY N. NESBITT TEAGUE

Augusta-Aiken Railway & Electric Corporation, Augusta, Ga.

For this company's pay-as-you-enter cars a conductor's seat has been developed by A. E. Kirkley by means of which the conductor can sit facing both the doors and passengers and at the same time operate the handles which open and close the entrance and exit doors. This also brings him into position to collect fares. When the seat is not in use it can be swung into an out-of-the-way position. A spring on the horizontal supporting brackets of the seat is arranged so that it will bring the seat itself into a vertical position when not in use. The picture and drawings indicate the other construction features.



CONDUCTOR'S FOLDING SEAT USED IN AUGUSTA, GA.

## One Telephone Booth Used for Three Phones in Noisy Office

BY J. J. CURLEY

Bay State Street Railway, Boston, Mass.

In noisy offices it is often difficult to use a telephone. To meet this annoyance this company has installed in one of its large shop offices a telephone booth. The office is provided with two public and one private telephone, the three instruments being placed on a shelf just outside of the booth and within easy reach of the clerk who answers them. The telephones are provided with extension wires connected to pulleys and weights so they may be passed to any desk. When on account of noise or the privacy of the conversation it is desired to use the booth, any one of the three telephones may be taken inside and the door closed tight, the extension cord running through casing. This arrangement has been used for some time in our shop office and has been found satisfactory.

In England the managers of a number of tramway companies are seriously considering the operating of "seatless" cars during the heavy rush-hour periods. In the Salford district, the company has removed the seats from several cars used in rush-hour service.

## Storage Battery Car Operation

On a 1¼-mile line between Point Shirley and the junction between the Boston, Revere Beach and Lynn Railroad the Point Shirley Street Railway is operating a four-motor storage-battery car. It is equipped with 225 "Beach" Edison type storage batteries manufactured by the Railway Storage Battery Car Company, New York City. The batteries are located under the longitudinal seats. Thirty-six round trips or 81 miles are made per day, and the batteries are charged at the Point Shirley end of the line after each round trip. The illustration shows the car being charged in front of one of the carhouses, energy being supplied by a gas-engine-driven generator.

STORAGE-BATTERY CAR BEING CHARGED AT POINT SHIRLEY, MASS.

In the three years that the car has been in service it has been necessary to renew the electrolyte but once, and no maintenance expenditure for new plates has been necessary in spite of the fact that they are subjected to severe overheating.

## Track Joint Maintenance at Colorado Springs

### Circular Saw and Electric Welder Prove Effective Aids in This Work

In rehabilitating the track work of the Colorado Springs & Interurban Railway, Colorado Springs, Col., cupped joints are removed by cutting 12 in. or 18 in. off the rail ends, and rail joints are made by welding Abbott base plates and ordinary angle-iron bars together. The old track was laid with 60-ft. 65-lb. A. S. C. E. T-rails, and where these are cupped at the joints the damaged rails are torn out and loaded onto a flat car, which is run to the company's shops. Here two air-operated hoists equipped with grip hooks lift one rail at a time off the flat car and lay it over on two rollers, properly placed for use with a regular circular steel saw. The hammered-out section at the end of the rail is then cut off and the rails placed back on the flat car. When one end has been cut off on all rails in a load, the car is run out of the shop and turned around so that the opposite ends of the rails are in the right position to be cut off with the circular saw when the car is brought back in. After this final cutting the rails are again loaded onto the car and returned to the job.

Wherever the rails are used in double-track work they are sawed off at an angle in order to get a 1-in. in 6-in. vertically beveled joint. By this means the weight of the equipment on the receiving rail is also supported by the leaving rails. This is a practice in use in several cities. Since this type of joint is valuable only for one-way traffic, it is not used on single track. In cutting off the ends, the rails are paired for length so that the joints will come opposite. By cutting off a short piece on each rail, a new length is required for about every twenty-five rails laid.

#### JOINT CONSTRUCTION

An Indianapolis welder is used to weld ordinary angle bars to Abbott base plates, thus forming a serviceable joint. After being cut off, the rails are drilled for the 4-bolt angle-bars, with holes at 5-in. centers. The two end holes in the rail web are, however, drilled 2 9/16 in. from the end to the center of the hole, making a length of 5⅛ in. between the two end holes when the rail ends are right together. In assembling the joint the outside bolts are first put in, but not tightened. Then a drift pin is driven into the two end holes to take up the slack between the rails and, when the bolts are driven in, the overlength distance between bolt-hole centers in the rails, takes up the slack between the bolts and the side of the bolt hole and brings the rail ends snugly together. The bolt holes are drilled 29/32 in. in diameter for ⅞-in. bolts.

## Multi-Curtain Support with Rain and Wind Deflector

### New Device Which Can Be Applied to Open and Convertible-Type Cars in Summer Service

The United Railroads of San Francisco are applying to the open ends of their California-type cars a new form of curtain support which permits all the curtains on one side to be operated in unison by the conductor. This support has been patented by Amos Perry, foreman car builder of the company, and his invention has also been adopted by the San Francisco-Oakland Terminal Railways. While designed originally for open-end California-type cars, the support is also applicable to the devilstrip side of open-bench cars and to convertible cars in summer service. Operation is effected as follows:

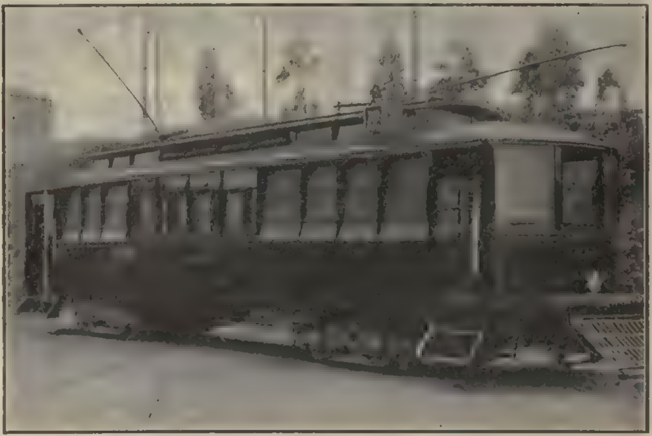
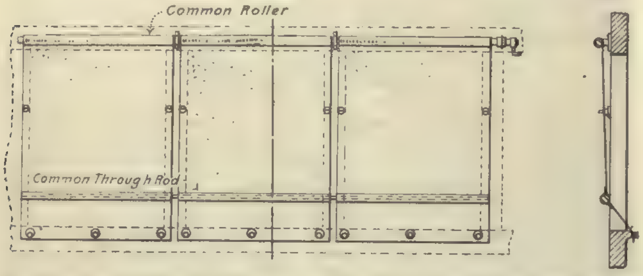


Photo by Mentz, San Francisco

CAR EQUIPPED WITH COMBINATION CURTAIN AND RAIN SHIELD

All of the curtains on a side are attached to one roller which is actuated by the conductor from a pawl-

and-ratchet mechanism on the platform like that in a roller-curtain sign. In addition to the top roller, the curtains have a common through rod at some 15 in. from the lower end. The bottom of each curtain has three eyelets which are hooked to headed buttons on the sills in such a way that that portion of each curtain which is below the through rod is pitched outward to form a rain deflector. This causes all the water to drain over the outside of the sill.



DETAILS OF MULTIPLE-OPERATED CURTAIN AND RAIN DEFLECTOR

In operation when it is desired to unreel the curtains it is necessary only to release the ratchet and turn the crank. The eyelets are then hooked on and the crank is turned in the opposite direction to pull the curtains taut. The roller is then locked by lowering the pawl.

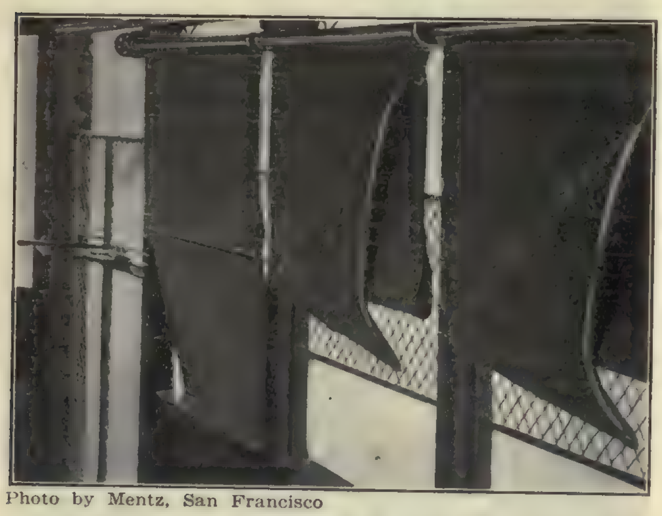


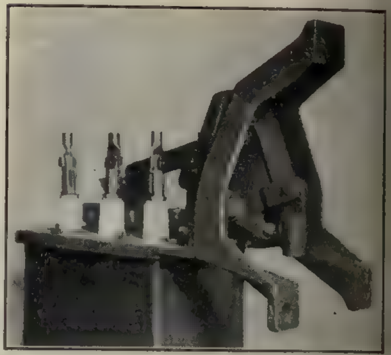
Photo by Mentz, San Francisco
INTERIOR VIEW OF COMBINATION CURTAIN APPLIED TO CALIFORNIA-TYPE CARS

No rain or wind can now enter the car nor can one passenger trifle with the curtains to the discomfort of other passengers. The common rod previously mentioned not only permits the desired deflection but also acts as a weight which causes the curtains to be tightly reeled about the roller when the curtains are raised. This rod also keeps the curtain from blowing outward.

## Shavings as Fuel for the Power Plant

On account of the continued uncertain condition of the coal supply and the difficulty of obtaining cars, the plant of the Hattiesburg (Miss.) Traction Company only burned two cars of coal during the month of June. The plant is getting about three cars of shavings per day from the lumber mills, and the company has been authorized to purchase six railroad cars for this purpose. This proposition will save the company in the neighborhood of $500 a month over coal at the present prices. There is a possibility of again negotiating with the J. J. Newman Lumber Company for the total fuel requirements, as the paper mill will not be erected until some time after the termination of the war.

## Wall-Mounting Brackets for Oil Circuit Breakers

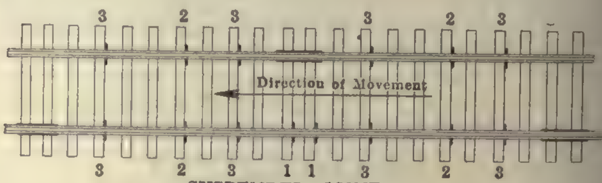


BRACKET FOR PANEL-MOUNTING OIL CIRCUIT BREAKERS

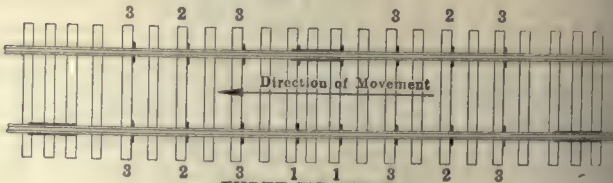
To meet a demand for brackets for use in supporting panel-mounting breakers on walls or pipe frames the Westinghouse Electric & Manufacturing Company has brought out a line of special brackets of which a typical one is shown in the accompanying illustration. The full line of brackets is described in a special bulletin recently issued.

## Anti-Creepers on Railway Track

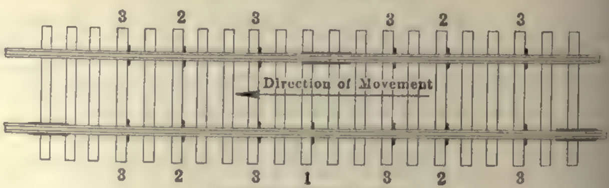
While the lighter traffic on interurban electric railways makes the use of anti-creepers for rail less important than on steam railroads, inquiry among a number of electric railway maintenance of way engineers shows that anti-creeping devices are used in a number of cases. These are principally on high-speed and elevated railways. The schedule of the track and roadway department of the Union Traction Company of Indiana with regard to the installation of anti-creepers provides as follows:



SUSPENDED JOINT



THREE TIE JOINT



SUPPORTED JOINT

When track is running not more than 1 in. per year, anti-creepers are installed as shown at 1-1 in the accompanying diagrams. When the track is running more than 1-in. per year and on all double track that is running, anti-creepers are applied as shown at 1-1 and 2-2. In extreme cases, additional anti-creepers, as shown at 3-3 are added.

# News of Electric Railways

Traffic and Transportation
Financial and Corporate
Personal Mention
Construction News

## San Francisco Rejects United Railroads' Offer

### City Engineer Submits Revised Company Proposal, but Public Utilities Committee Votes Plan Down

At a meeting of the public utilities committee of the San Francisco Board of Supervisors on Aug. 3, the vote was four to one against accepting the compromise plan of the United Railroads of San Francisco for handling traffic on Market Street and through the Twin Peaks tunnel. The committee recommended that outer tracks for the Municipal Railway be at once constructed on Market Street and that the system beyond the tunnel be extended. The committee's report has yet to be approved by the Board of Supervisors at the meeting on Aug. 13, but it is believed that sanction will then be accorded without delay.

Plans were discussed for using a portion of the reserve funds of the Municipal Railway, which now amount to more than $800,000, for the construction of a line from the west portal of the tunnel to Twentieth Avenue and Taraval Street, a distance of about 3000 ft. At that junction the city could exercise its charter and run cars over the line of the Taraval Street Railway, now under lease to the United Railroads and extending through Parkside. A plan for taking over the United Railroads' lines to connect with Ingleside and other subdivisions was also considered.

#### REPORT OF CITY ENGINEER ON COMPANY'S PROPOSAL

When the United Railroads presented its proposal for an agreement with the city, involving the use of the Twin Peaks tunnel by the company's cars, the extension of its lines beyond the peaks, the adoption of universal transfers between city and company, as noted in the ELECTRIC RAILWAY JOURNAL of July 14, the public utilities committee asked City Engineer M. M. O'Shaughnessy for a report to guide it in considering the offer. In his report, which the committee received on July 25, the city engineer analyzed the company's proposal from an engineering and economic standpoint, but he refrained from definitely advocating acceptance or rejection of the offer.

According to Mr. O'Shaughnessy's report, after the receipt of the proposal two conferences were had with the company, in which certain objections offered to the form and tenor of the proposal were considered. It was suggested that the proposal be revised and expanded to set forth in detail its full purpose and intent.

The offer as revised, therefore, said Mr. O'Shaughnessy, would conform in substance to various provisions, some of which are abstracted below:

1. That the company construct tracks connecting with the tunnel tracks at the west portal of the Twin Peaks tunnel, extending thence to connect with the existing Taraval Street tracks of the United Railroads at Twentieth Avenue and extending out Taraval Street to the ocean.

That the company connect its tracks with the city's tunnel tracks at the proposed terminus at Sloat and Junipero Serra Boulevards, so as to render possible through service in both directions through the tunnel to the ferry, and that the company make a connection from its existing Market Street tracks to the eastern terminus of the city's proposed tunnel tracks near Castro Street.

2. That the company pay the city $1,333.33 a month as a rental to cover use and deterioration of the city tracks and appurtenances, until the car mileage reaches or exceeds 750 miles per day on the basis of the established schedule, and thereafter in addition 1 cent per car-mile operated above 750 car-miles per day.

That the company assume all liability for safe conduct of transportation through the tunnel and over the city's tracks, maintain the illumination of the tunnel and stations, maintain the tracks and overhead equipment to the approval of the city engineer, and reimburse the city at cost for any power used from city lines.

3. That there be exchanged between the company and the city transfers at all connecting points, such exchange to be on a free basis and limited only by such rules as may be necessary to prevent the abuse of the transfer privilege—such transfer agreement to supersede all existing transfer agreements and to apply to all future extensions of both the United Railroads and the city.

## Mayor O. K.'s Transit Lease

Mayor Smith of Philadelphia, Pa., is ready to turn over to City Solicitor Connelly for his legal opinion and for drafting in the form of an ordinance the Twining lease of the city's high-speed transit lines to the Philadelphia Rapid Transit Company. The synopsis of the lease as revised in some parts by Director Twining in the last few days was returned to the Mayor on Aug. 8 and received his approval. He expressed the belief that the draft of the lease is couched in such explicit language that the City Solicitor can pass upon it and draft the ordinance within a comparatively few hours. It is expected that the ordinance will be presented to Councils at the special meeting to be held on Aug. 17.

The Mayor said that before being acted upon by Councils the proposed lease would be given the widest publicity. The committees on finance and street railways, to which the ordinance would be referred, he suggested, would doubtless hold public hearings for discussion of the terms. The Mayor said that he would invite representatives of business organizations to go over the ordinance with him before submitting it to Councils.

The tentative draft of the new contract was handed to the Mayor by Director Twining on Aug. 2. The Mayor refused to disclose the terms. The draft, however, is supposed to represent the harmonized views of the Mayor and officials of the Philadelphia Rapid Transit Company.

## Subway Vote Assured in Cleveland

A popular vote on Mayor Davis' subway plan at Cleveland, Ohio, was assured on Aug. 4, when petitions containing 5384 names had been filed. Only 5000 are required to initiate an ordinance, but it is thought that at least 20,000 names will be secured by the time Council holds its next meeting on Aug. 27. If the Council fails to act favorably on the ordinance before Oct. 6, the question will be referred to the voters at the regular election on Nov. 6.

What is known as the civic rapid transit committee, containing representatives of fourteen civic organizations, circulated the petitions and is aiding in the campaign in other ways. The names filed were secured in one day. This indicates the willingness to have the subway question considered by the voters.

The plan has been changed so that the ordinance provides only for the appointment of a rapid transit commission, in accordance with the terms of the State law. Such a commission would have power to consider the subway problem and formulate plans for its construction. The commission could not proceed further than an investigation until provision for financing the proposition was made by additional legislation.

The reason for this is that Mayor Davis thought it best to approach the matter by degrees rather than by presenting the entire plan, including a bond issue, in the one ordinance. If the commission reports favorably upon a plan, then the bond issue can be presented in another ordinance. Thus the idea can be carried out by successive steps and will probably be much better understood, as the voters will have an opportunity to study it piecemeal.

## Strike On in Kansas City

### Two Hundred Men Went Out on Aug. 8—Company Refused to Consider Demands of Discharged Employees

Following the lead of a few discharged employees who had made a demand for reinstatement and the right to organize, a large group of employees of the Kansas City (Mo.) Railways struck on Aug. 8. The company states that service will be continued as far as possible and that no negotiations will be carried on with the strikers. Twenty per cent of the trainmen showed up on the morning of Aug. 9, but no cars were sent out. New men are being employed and trained, but no strikebreakers are being imported. There has been no trouble at power houses or shops, and the public is generally good natured under inconveniences.

Mangus Sinclair, national organizer of the Amalgamated Association of Street and Electric Railway Employees, has been directing the initiation of former employees of the company into a newly organized union. The present employees made no requests and the only demands came from employees discharged during the last week or so. These discharged men demanded their reinstatement and the right to organize, and they threatened to cause employees to strike at 4.35 a. m. Wednesday. Because they were not employees, their requests were not considered.

Wednesday morning car service began as usual. About 200 men had struck by noon, but service continued. Strikers and agitators gathered at the carhouses to jeer at the workers, and a few bricks were thrown, one motorman being hit while at his controller. There were no policemen on the cars, although the police had promised to protect property if necessary. Many loyal conductors were afraid to operate cars and left them in the carhouses after one or two runs. By 4 p. m. city service was practically suspended, and no cars were run after 6 p. m. All interurban lines were running near schedule, although some refused to take on passengers within city limits unless they were bound for outside points.

During the afternoon the only members of the board of directors representing the city who were in town, John W. Wagner and D. M. Pinkerton, held a conference with Robert P. Woods, city member of the Board of Control; Mayor Edwards; Police Commissioner Ranson; Clyde Taylor, vice-president of the company, and J. E. Gibson, general manager. Company officials asked adequate police protection, and city representatives also urged this. The Mayor and the police commissioner promised police for important points who would do all necessary to protect property and men.

## Mysterious "System" Excites Curiosity

### Circulars from Philadelphia Describe Wonderful Way of Increasing Income, but Do Not Disclose Method

Electric railway executives throughout the country have been wondering during the last few weeks what plan the United Public Service Corporation of Philadelphia, Pa., is offering them so guardedly for the increase of their net income. This "system" has been addressing correspondence to the electric railways which tells absolutely nothing about a proposition for which most extravagant results are predicted. In order to learn the details of the scheme, so secretive and confidential a procedure is outlined that the railway men are naturally tempted to go about it most any other way than that required by the company.

Electric railway men who have investigated the scheme say that it combines a phase of popular merchandising and advertising with railroading. They look upon it as the vision of one knowing more about promoting and advertising than electric railway operation. Its adoption, they assert, will impose upon the conductor duties which would hamper him in the efficient operation of his car. The proposition is regarded as one calculated to use the electric railway as a means of furthering some other object than the carrying of passengers.

At his office in Philadelphia, Wallace D. Taylor, president of the company, refused to make a statement for publication at this time.

The letter sent to electric railway executives arouses interest with the following opening paragraph:

"If the net earnings of your company, applicable to dividends, can possibly be increased 50 per cent to 100 per cent
without increase in population of community served,
without increase in number of passengers carried,
without increase in fares,
without increase in rolling stock,
without increase in capital invested in amusement parks,
without selling more electric light, heat and power,
without increase in capital of company,
would you cheerfully turn back to those making such a result possible a reasonable PORTION of the NEW profits they would ACTUALLY CREATE for you?"

The letter than proceeds to express the predictions of the promotor as to the very large increase in net revenue to accrue to the companies adopting the "plan" beyond "the slightest doubt whatever." Yet, instead of giving the reader any inkling of the details, a form of agreement was inclosed, which, if signed by the proper executive and returned, would bring the secrets of the mysterious scheme. This agreement states that if the plan is adopted a formal contract will be made. On the other hand, if the system is rejected, the signer agrees "not to make use of any of the ideas or methods contained in said public service system, or any modification thereof, without written permission, at any future time," even though brought to his attention by "some other corporation, firm or person."

It is further agreed "not to give, directly or indirectly, to any one, any of the details of said system, except officers or directors of our corporation, and this agreement will bind them not to give any details to others."

The letter closes with the postscript: "It will be USELESS to request information by letter, or wire, or send a personal representative to try to obtain it, until after we have received the preliminary agreement, properly signed."

## Wages and Hours to Be Arbitrated

### What Each Side Gained in Seattle and Tacoma Settlements—Big Falling Off in Jitney Operation

Formal sessions of the board of three arbitrators to determine the wages and hours of the employees of the Puget Sound Traction, Light & Power Company in Seattle and Tacoma, Wash., will probably not be held for ten days or two weeks. Charles A. Reynolds, attorney for the men, will require at least ten days to assemble data. The reaching of the strike settlement on Aug. 1 and the choosing of the arbitrators were noted in the Electric Railway Journal of Aug. 4.

The board of arbitrators appointed has power only to arbitrate the issues of pay and hours, and both sides have bound themselves to abide by its decision. When the carmen walked out, the highest pay any of them was getting was 36 cents an hour after five years of service. Their demands call for 45 cents an hour for the first year and 50 cents an hour thereafter. An additional 2 cents an hour for trainmen in freight service is asked, as well as an eight-hour day with double pay for overtime.

In the arbitration agreement signed on Aug. 1 concessions on important matters were made by both the parties. The company's main victory was the open shop. There is to be no discrimination against non-union men or any coercion to make them join the union. Moreover, future grievances are to be presented by company employees and not by outside labor representatives. The big point gained by the strikers is the retention of their organization. They may belong to any union they like, and there is to be no discrimination against union men. Furthermore, the employees gained the reinstatement of the two discharged Seattle employees, and the seven men discharged in Tacoma are to be taken back if an arbitration board of their fellow employees so decides.

With return of street car operation in Seattle and Tacoma, there was a big falling off in the volume of jitney service. All of the heavy trucks that had been pressed into service went back to the freight business. Moreover, many of the automobiles that had been running on the longer car lines and charging 10 cents dropped out. In Seattle, Attorney William R. Crawford of the Auto Bus Drivers' Union, estimated that between 400 and 500 automobiles dropped entirely out of service.

Of the remainder, 197 cars under federal injunction are operating on new routes not along car tracks. Judge Neterer on Aug. 2, in the United States District Court, ruled that his former injunction, which was suspended during the strike, would now be enforced. With the resumption of service A. L. Valentine, Superintendent of Public Utilities, ordered his deputies to enforce the law in regard to all jitneys operating without the necessary for-hire license.

Upon motion of Corporation Counsel Hugh M. Caldwell, the city of Seattle's case against the Puget Sound Traction, Light & Power Company for a writ of mandamus compelling it to run street cars or show cause in court why a receiver should not be appointed, was dismissed on Aug. 2 by Superior Court Judge King Dykeman. The counter claim and cross complaint of the traction company was also dismissed.

## Investigating Utilities in North Dakota

A committee of officials of North Dakota, consisting of the Governor, Attorney General, the chairman of the State Tax Commission and the chairman of the State Railroad Commission, has engaged Hagenah & Erickson, Chicago, Ill., to investigate all public utilities in the State.

The purpose of the investigation is to supply the State departments with accurate data regarding these properties. The investigation will embrace a detailed inventory and appraisal of each property and an analysis of earnings and operating expenses for a number of years.

The appraisal work has been in progress for several weeks, and engineers from the firm are now making inventories in Bismarck, Fargo, Grand Forks, Minot, Jamestown, Mandan and many smaller cities. Certified public accountants in their employ will examine the books after completing the appraisals.

## St. Louis Objectors to Submit Substitute Plan

### Civic Bodies Oppose Proposed Ordinances—What Frank Putnam Thinks Are Obvious First Steps to Solution

Representatives of the Civic League, the Central Trades & Labor Union and the Tenth Ward Improvement Association, in opposing the proposition pending in the Board of Aldermen for a settlement with the United Railways of St. Louis, promised the public utilities committee at the public hearing on Aug. 1 that their respective organizations would prepare and submit substitutes for the plans contemplated in the proposed ordinances. These were described in the ELECTRIC RAILWAY JOURNAL of July 21. Until the data promised are presented to the committee, it is said, there probably will be no further public hearings.

Objections urged at recent hearings by speakers against the two proposed ordinances were leveled at the proposal for a partnership between the city and the company, the valuation fixed, the granting of a new franchise, the long period of the grant (which is fifty years in each of the propositions), and the abolition of the mill tax.

#### FIRST STEPS TO SETTLEMENT

Frank Putnam, publicity agent North American Company, the holding corporation of the United Railways, in a letter to the *Post-Dispatch* on July 29, set forth what, in his opinion, should be done to settle the issues between the city and the company. According to Mr. Putnam, the obvious first steps to a rational solution of the problem are these:

"1. An agreement by stock and bond holders to scale down, equitably to all, the face of their securities, to a total equal to the present fair value of the property and business, excluding outlawed franchise values.

"2. A decision by the city government:

"(a) To cease supertaxing the street railway service;

"(b) To co-operate with it in every way (as in Cleveland), to reduce its expenses, so that its earnings, after paying a fair return to the labor and the capital engaged, may be devoted to extending, improving and, when possible, cheapening the service:

"(c) To give the company the best possible franchise, so that it may get capital at least cost for desired extensions and other permanent betterments of the system."

## Cincinnati Transit Progress

### Change of Location of Proposed Interurban Terminal Under Consideration—Chamber of Commerce Man for Railway Commissioner

At a meeting of the Cincinnati Rapid Transit Commission on Aug. 3 Chief Engineer Frank S. Krug reported that he has under consideration the construction of an interurban terminal station and loop under Government Square, to take the place of the proposed station at Canal and Walnut Streets, as originally proposed. As yet, however, the plans and estimates have not proceeded far enough to determine the practicability of the idea.

Mr. Krug is of the opinion that the wide area under the square would provide an ideal location for the terminal station, as it would not only furnish the most convenient service for the traveling public, but would provide plenty of room for the storage of interurban cars and a loop for turning them.

As only three of the members of the commission were present, discussion of the new plan was postponed to a later meeting. It is expected that Mr. Krug will then be prepared to submit plans and specifications and an estimate of the cost of such a terminal station.

Mr. Krug reported that he had completed plans for a concrete elevated structure on Pearl Street to take the place of the steel structure originally contemplated. The concrete structure, he said, will be more ornamental and will now involve less cost than steel work.

#### DIRECTOR OF STREET RAILROADS TO BE APPOINTED

The commission approved the proposed section of the new charter creating the office of director of street railroads and defining his powers and duties, with the exception of a clause which stipulated that the Rapid Transit Commission and City Council could not act, except upon the recommendations of the director on proposals for new extensions, new routes or change of routes. The charter commission was asked to eliminate this, as it encroached on the powers of the Rapid Transit Commission and the City Council.

The new charter commission on Aug. 6 submitted a redraft of the clause about the director of street railroads. As it now stands, the clause clothes this official with authority to exercise the powers of the Mayor and Street Railway Commission under existing ordinances, and also the powers of the Rapid Transit Commission which are not reserved specifically to the commission by the rapid transit act.

It is provided further that the City Council and the Rapid Transit Commission shall refer all matters regarding extensions, new routes and change of routes to the director of street railroads for his advice. It is understood that the clause is now satisfactory to all city officials and commissions and to the railways.

#### CHAMBER OF COMMERCE SECRETARY CHOSEN

William C. Culkins, for some years executive secretary of the Cincinnati Chamber of Commerce, notified Mayor George Puchta on Aug. 1 that he would accept the appointment of street railway commissioner, recently made by the City Council, on condition that provision for the office be made in the new city charter, so that it be removed from the control of the City Council. As has been noted above, the charter commission has made such a provision under another name. The salary will be $7,500 a year.

The appointment must be ratified by the Rapid Transit Commission, but it is understood that all the members are favorable to Mr. Culkins, and that in this case the approval will be only a matter of form. Mr. Culkins stated that he would submit his resignation to the Chamber of Commerce within a few days. He will assume his new position on Sept. 1.

**Reading Men Receive More Wages.**—Effective Aug. 1, the Reading Transit & Light Company, Reading, Pa., has increased the wages of motormen and conductors 1 cent an hour, making the maximum 28 cents an hour. The increase benefits 600 employees of the company. This is the fifth increase granted during about the last year and means an increase of $20,000 in the annual payroll.

**Newspaper Comments Upon Strike Handling.**—In a leading editorial the Oregon *Journal* on July 31 praised F. T. Griffith, president Portland Railway, Light & Power Company, for his handling of the recent strike in Portland. The newspaper attributed the present harmony between company and men to the fact that Mr. Griffith promptly announced his willingness for the employees to unionize.

**Cars Again in Operation at Lima.**—After a lapse of almost a week street cars were again put into operation at Lima, Ohio, on Aug. 6. No more violence was expected, but rioting started again late on Aug. 9 and three men were shot. State arbitrators have endeavored to adjust the differences between the Ohio Electric Railway and the striking motormen and conductors, but failed. The strike began July 11.

**Militia Called Out in Springfield.**—Five hundred National Guardsmen on Aug. 7 were ordered on strike duty in Springfield, Ill., by Governor Lowden as the result of the killing of a policeman during an attack on a street car of the Springfield Consolidated Street Railway. The rioting followed an attempt by the company to resume night service, which had been suspended for ten days. The beginning of the strike was noted in the ELECTRIC RAILWAY JOURNAL of Aug. 4.

**Wages Increased in Quincy.**—The minimum wages of trainmen of the Quincy Railway & Light Company, Quincy, Ill., have been increased, effective Aug. 1, 40 cents a day, to a total of $2.20 a day. The maximum wage has been increased 10 cents a day, bringing this up to $2.75 per day. An increase is also under consideration for the carhouse and office men. The increase for the trainmen was brought about as a result of a conference between a committee of the employees and the officials of the company.

**For an American Academy of Engineers.**—A bill has been introduced in the United States Senate by Senator Brandagee to incorporate the American Academy of Engineers with 200 members. Among those who submitted arguments in favor of this plan were J. A. L. Waddell, Gen. G. W. Goethals, S. W. Stratton and C. O. Mailloux. Others mentioned as incorporators and members of the Academy were: Dr. Louis Bell, Dr. W. F. M. Goss, Dr. A. C. Humphreys, William Barclay Parsons, E. W. Rice, Jr., Frank J. Sprague and John F. Wallace.

**Women Conductors Not to Be Used at Norfolk.**—It was the idea of the Virginia Railway & Power Company, Norfolk, Va., to try one of two women with a view to determining whether or not they could take the place of the regular conductors on the company's cars in the event that the shortage of labor in the vicinity of Norfolk should make it necessary to replace men with women. Owing to the ability of the company to secure men from other parts of Virginia and from outside the State, however, the idea of using women has been abandoned for the present.

**Railroad Valuation Act Declared a Failure.**—Evidence is accumulating that the federal valuation of railroads, begun pursuant to an act of Congress four years ago, has in reality progressed so little that the expected value of the work has far from materialized. There have been interminable arguments in regard to the theories followed by the Interstate Commerce Commission and the practices of its valuing engineers, and now the few companies that had completed their inventories as of June 30, 1914, have been ordered to bring them down to date. It is reported that some railroads declare the valuation act is a failure and that a repeal will be asked at the next session of Congress, when the wa business may be finished.

**Wage Increase in West Milton.**—The conductors and motormen of the Dayton, Covington & Piqua Traction Company, West Milton, Ohio, have been granted an increas of 3 cents an hour, together with the premiums as receive during the last five years. The premiums are 5 cents day additional after five years of service, and 1 cent a da additional for each year of service thereafter. The men als receive $5 extra for each six months that their recor of service is without demerit. It is reported that som of the employees have organized and desire a larger wag increase.

**West Side Contract Nears Completion.**—The drawing o a new contract between New York City and the New Yor Central Railroad Company for the west side electrificatio and park improvement, which has been going on for several weeks, is practically completed. Reports as to th progress were submitted on Aug. 3 at a meeting of th joint conference committee of the Public Service Commission and the Board of Estimate. Under the law enacte at the last session of the Legislature an agreement mus be reached by Dec. 1, or full control of the matter wil pass into the hands of the Public Service Commission During the drawing of the contract a careful examinatio was made of the franchises, rights, easements and propert titles of the railroad along the west side, and an earl report covering all of these points will be made. Publi hearings will soon be held to discuss fundamentals and t receive any suggestions the public may care to make.

**Bonus Granted Chicago & Joliet Employees During Wa —**The Chicago & Joliet Electric Railway, Joliet, Ill., ha granted all its employees a bonus of 7.5 per cent of thei wages, dating from July 1 and extending through th war period or until conditions become normal. This increase affects about 300 employees and will increase th payroll between $15,000 and $20,000 a year. While th company had a contract with the local division of th Amalgamated Association of Street & Electric Railwa Employees which fixed the scale of wages until June 30 1919, it was deemed advisable to grant this special wag increase to offset the large increase in the cost of livin and the advanced wages paid for labor in other lines o industries. Both of these conditions have tended to mak it difficult to hold the men in the employ of the railwa or to secure the additional help required for increase business.

**Commission Wants Junior Electrical Engineer.**—The Ne York Civil Service Commission has announced an ope competitive examination on Sept. 8 for a junior electrica engineer for the Public Service Commission for the Firs District of New York, at a salary from $901 to $1,200 year. The duties are to inspect the power houses and equipment of subway, elevated and street railway, lighting an power companies in New York City. Candidates must hav had at least three years' training in a technical school o recognized standing and not less than one year's experience in electric railway or electric lighting work or in th manufacturing or installation of electrical or mechanica apparatus. Subjects of examination and relative weights Theoretical and practical questions relating to the construction and operation of power house and railway equipment electric distribution, measurements, standards and other pertinent subjects, 5; experience and personal qualifications, 3 education, 2. The examination is open to non-residents.

## Program of Association Meeting

### National Association of Railway Commissioners

Notice has been issued in regard to the twenty-nint annual convention of the National Association of Railwa Commissioners in Washington on Oct. 16-20. At this convention the present vital problems of regulation, includin the functions of utilities in serving in the nation's need, th requests of utilities for increases in rates and for authorit to diminish or discontinue service and the requests of th public for reasonable rates and more adequate service wil be discussed with a view to uniform constructive action b the various commissions.

# Financial and Corporate

## Annual Reports

### Terre Haute, Indianapolis & Eastern Traction Company

The income statement of the Terre Haute, Indianapolis & Eastern Traction Company, Indianapolis, Ind., for the year ended Dec. 31, 1916, follows:

| | | |
|---|---|---|
| Gross earnings from operation | | $3,199,523 |
| Operating expenses | | 1,863,678 |
| Net earnings | | $1,335,845 |
| Taxes | | 161,451 |
| Operating income | | $1,174,394 |
| Other income: | | |
| Dividends on stocks owned, etc | $138,436 | |
| Sale of power | 122,860 | |
| | | 261,296 |
| Gross income | | $1,435,690 |
| Deductions and rentals: | | |
| Bond interest | $769,323 | |
| Dividends | 221,833 | |
| Interest on notes | 38,565 | |
| Maintenance of organization, leased lines | 3,000 | |
| | | 1,032,722 |
| Surplus | | $402,968 |
| Sinking fund | | 198,822 |
| Balance | | $204,146 |

The gross earnings for 1916 showed an increase of $245,404 or 8.31 per cent over those for the year 1915. This increase was made up of $206,438 or 8.44 per cent in the railway department, and $38,966.63 or 7.64 per cent in the light and power department. All divisions showed increases. Operating expenses for 1916 were $101,455 or 5.76 per cent in excess of those for 1915, principally on account of the increased cost of labor and material. The total expenditures on the railway property during 1916 on account of maintenance were $503,038, or 19.3 per cent of railway earnings. A sum of $330,315 was expended for maintenance of way and structures, and $172,722 for maintenance of equipment. Taxes in the last year increased $12,128.

During 1916 there was expended for added property and charged to capital account the sum of $41,560. The total amount to Dec. 31, 1916, expended for construction purposes, for which no securities have been issued, is $996,964. In 1916 the company paid to the trustees on account of sinking funds $198,821, making the total invested in sinking funds to Dec. 31, 1916, $710,046. With $261,134 invested in securities of affiliated companies, the total investment of company funds amounts to $1,968,144.

Miscellaneous traffic and operating statistics for the year ended Dec. 31, 1916, follow:

| | |
|---|---|
| Passengers carried—interurban lines | 8,638,749 |
| Passengers carried—city lines | 13,073,586 |
| Total passengers carried | 21,712,335 |
| Freight handled (tons) | 89,085 |
| Express handled—exclusive of Wells-Fargo Express (tons) | 15,646 |
| Car miles operated—interurban lines | 5,826,710 |
| Car miles operated—city lines | 2,127,328 |
| Coal consumed at power stations (tons) | 209,569 |
| Power generated, main power stations (kilowatt-hours) | 91,061,040 |

### Oakland, Antioch & Eastern Railway

The total operating revenue of the Oakland, Antioch & Eastern Railway, Oakland, Cal., for the calendar year 1916, amounted to $620,216, this being divided as follows: Passenger, $471,121; freight, $108,701; express and milk, $25,887, and other sources, $14,506. The operating expenses totaled $437,255, giving an operating ratio of 69.4 if a fire loss of $6,930 be excluded. The gross income amounted to $153,476, and deductions to $363,708, so that the net result was a deficit of $210,231 for the year.

The number of passengers carried in 1916 was 722,138, and the tons of freight hauled were 158,027. The total car mileage amounted to 1,987,267. The passenger earnings in 1916 were $35,865 or 7 per cent less than those of 1915, on account of the Exposition business being ended. The gross revenues, however, exceeded those of 1915 by $14,799, this being due mostly to an increase of $44,575 or 69 per cent in freight.

During 1915 and 1916 the company worked under the financial plan adopted by its security holders. The average gross earnings during these two years, or $612,816, exceeded the 1914 gross by $131,507 or 27 per cent. For the two months of January and February and the first twenty-four days of March, 1917, the gross earnings showed a gain of $28,979 or 30 per cent.

While it is problematical whether this rate of increase can be maintained, the company says, its territory is beginning to awaken, and it would seem that in two years its earnings should about equal operating expenses and interest on funded and unfunded debt. The financial difficulties now present are the formulation of a plan to meet the interest charges until they are fully earned, and the devising of a method for funding or liquidating $1,000,000 of floating indebtedness.

## Omaha Ouster Suit Argued

The first hearings in the suit of the city of Omaha, Neb., to secure a settlement from the Omaha & Council Bluffs Street Railway under the reversion clause of the legislative franchise of 1867 to the Omaha Horse Railway, were held on July 26 and 27. This franchise, the city asserts, expired on Jan. 1, 1917. The city wants an accounting for its alleged interest in the present property.

The company, however, states that the tangible property of the old horse-car line now amounts to nothing, and that the city cannot hold any intangible interest after voluntarily permitting the old line to be abolished. The company, therefore, has moved that the city should not be allowed to trace the funds of the horse-car railway through subsequent mergers, and the judges in the United States District Court have reserved decision.

Previous references to this case were made in the ELECTRIC RAILWAY JOURNAL of Jan. 20, 1917, and March 17, 1917.

## Modified Dry Dock Plan

### Protective Committee of Third Avenue Subsidiary Certificate Holders Urges Acceptance of New Refunding Plan

The protective committee for the 5 per cent certificates of indebtedness ($1,100,000 outstanding) of the Dry Dock, East Broadway & Battery Railroad, New York, N. Y., has issued a circular in regard to a modification of its refunding plan. On June 21, 1916, the committee gave notice that a refunding plan had been adopted. Counsel for the committee has advised it, however, that as the Public Service Commission has not authorized the issue of $1,501,500 par value of series "C" refunding bonds but only of $1,300,200 par value, there is serious doubt as to whether the Third Avenue Railway, the controlling company, is under any obligation to modify the agreement made in June, 1916, and accept one-half of the amount of series "C" bonds now authorized.

The Third Avenue Railway, nevertheless, has offered to accept $528,000 par value of series "B" bonds and $650,100 par value or one-half the authorized issue of series "C" bonds, provided the holders of the 5 per cent certificates of indebtedness will accept the other half of the series "C" bonds. The entire issue of series "C" bonds, however, is to bear interest at the rate of 5 per cent, if earned, from July 1, 1915, to July 1, 1925, and thereafter at the fixed rate of 4 per cent with an additional 1 per cent, if earned, until the maturity of the bonds in 1960.

During the nine and one-half years which have elapsed since the committee was organized, it is said, the gross passenger earnings and the net earnings of the Dry Dock line have steadily decreased, so that at the present time it does not seem likely that any interest on the series "C" bonds will be earned for a number of years. The reduction of the rate of interest, if earned, from 6 per cent to 5 per cent will not, therefore, be of any real disadvantage to holders of the 5 per cent certificates of indebtedness, as it is most unlikely that as much as 5 per cent interest will be earned prior to 1925, or that any interest in addition to 4 per cent will be earned thereafter.

The Third Avenue Railway holds not only $480,000 of 6 per cent receiver's certificates, but also other 6 per cent claims against the Dry Dock company which the federal court has allowed at $1,500,000. Under the plan now proposed the Third Avenue Railway will surrender all these claims for the $528,000 of series "B" bonds and $650,100 of series "C" bonds. Unless the plan now proposed is accepted, the claims will be valid in full for the amount stated with arrears of interest. If the certificate holders do not agree to this modified refunding plan, the committee says, they are not likely to get anything.

The committee has, therefore, adopted a further modified refunding plan which is binding upon the depositing certificate holders unless the holders of more than one-third in amount of the certificates file written notice of dissent with the Union Trust Company, New York, before Sept. 15, 1917. The debts which are to be refunded aggregate $4,162,000, exclusive of interest. This indebtedness will be refunded and future requirements provided for by making a general refunding mortgage covering the property with the priorities as follows:

| | |
|---|---|
| Series "A" 5 per cent bonds, to be a prior lien and preferred as to both principal and interest—not over.... | $1,500,000 |
| Of this amount $950,000 is applicable only to refund the outstanding $950,000 of general mortgage bonds. A total of $550,000 may be issued to acquire additional property and for betterments. | |
| Series "B" bonds, to bear interest at the fixed rate of 4 per cent per annum from July 1, 1915, until Jan. 1, 1960. A prior lien over, and preferred as to both principal and interest over series "C" bonds.......... | 528,000 |
| Series "C" bonds, to be dated July 1, 1915, and to bear interest as noted above............................ | 1,300,200 |

The holders of $1,100,000 of certificates of indebtedness are to receive in full settlement of principal and all accrued interest thereon $650,100 of series "C" bonds, these to be distributed pro rata in the ratio of $59.10 in face value of series "C" bonds for each $100 face value of certificates of indebtedness. The Third Avenue Railway will contribute $21,000 in cash toward the expenses of the committee, the fees of their counsel and a reasonable allowance to the members of the committee.

## Northwestern Penn Amalgamation Nearing Completion

In January, 1916, the Northwestern Electric Service Company, a new company, was authorized to issue: (a) $200,000 of first preferred stock, viz.: $173,500 for cash, $20,000 for property and $6,500 in exchange for an equal amount of stock of twelve light and power companies which were merged to form the company; (b) $455,000 of second preferred stock in exchange for second mortgage bonds of the Northwestern Pennsylvania Railway, Meadville, Pa., and (c) $1,050,000 of common stock in exchange for the stock of the railway. These exchanges were to give to the Northwestern Electric Service Company the control of the railway through ownership of all the common stock of the latter.

The amalgamation, it is now said, has not yet been completed. The management, however, has the promise of sufficient stock of the Northwestern Pennsylvania Railway to give the new company a voting majority which would make the exchange proposition operative. It is hoped to complete this exchange of securities within thirty days.

It is contemplated that between $800,000 and $1,000,000 of common stock will be issued in purchase of a majority of common and preferred stock of the Northwestern Pennsylvania Railway on an offer which was extended on the following basis: In purchase of common stock, Service common at par for Railway common at 30. In purchase of preferred stock, Service common at par for Railway preferred at par.

No definite action has been taken as to cancellation of interest on the railway second mortgage. The largest holders of these bonds are agreeable to such action, and an effort is being made at this time to form a bondholders' committee to represent all or a majority of these bondholders, such committee to act with the company in carrying out the plan. Should the cancellation of interest for a proper period go into effect, the proposed exchange for second mortgage bonds would probably, it is said, be withdrawn.

The present property of the Northwestern Electric Service Company consists of the following: (1) 50 miles of 33,000-volt transmission line between Erie and Harmonsburg, with a branch between Erie and Kearsarge. (2) Distribution lines in the following localities, all of which are in Erie and Crawford Counties, Pa.; Saegerstown, Venango, Cambridge Springs, Edinboro, Middleboro (McKean), Fairview, North Girard, Linesville and Harmonsburg.

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**Atlantic City & Shore Railroad, Atlantic City, N. J.**—The Atlantic City & Shore Railroad has arranged to take over and operate in connection with its Ocean City and Central Passenger Railway lines the single-track road leading into Venice Park, known as the Venice Park Railway. The line has been closed for more than a year and the residents of the park section had to walk or use a jitney. The Atlantic City & Shore Railroad has arranged a system of transfers so that people can ride from any part of the shore resort to Venice Park for a fare of 5 cents.

**Boston (Mass.) Elevated Railway.**—A quarterly dividend of 1½ per cent has been declared by the Boston Elevated Railway, payable on Aug. 15 to holders of record on Aug. 2. On May 15, one-half of 1 per cent was paid. Since 1916 dividends have been paid as follows: February, 1½ per cent; May, one-half of 1 per cent; August, November and February, 1917, 1½ per cent; May, one-half of 1 per cent.

**Chickasha (Okla.) Street Railway.**—On account of an increase in valuation from $32,000 to $120,000 by the State Board of Equalization, it has been announced that the operations of the Chickasha Street Railway will be suspended unless a fair valuation is made without delay. The company has never paid dividends and has barely been able to meet bond interest.

**Columbus, Delaware & Marion Railway, Marion, Ohio.**—Judge Kinkead has ordered the following payments in the receivership case of the Columbus, Delaware & Marion Railway, which was recently sold to the Columbus, Delaware & Marion Electric Company: Eli M. West, receiver and master commissioner, $10,000; receiver's counsel, Harry F. West, $7,000; Bankers' Trust Company, Cleveland, $1,500; bank's counsel, $7,500; Cleveland Trust Company, $3,000; bank's counsel, $3,700; Guaranty Trust Company, $500; bank's counsel, $1,250. Receiver West was instructed to file his final report, preliminary to discharge.

**Columbus Railway, Power & Light Company, Columbus, Ohio.**—The Columbus Railway, Power & Light Company has arranged to issue $576,000 of 6 per cent secured notes, dated Aug. 2, 1917, maturing Aug. 1, 1918, and secured by deposit of first refunding and extension mortgage bonds. The Public Utilities Commission has granted authority to sell the notes, because of the company's failure to sell all of the $1,846,000 of 5 per cent bonds authorized for sale at 90. The company desires to continue the construction of its power plant, and the proceeds will be used for this purpose.

**Dunkirk (N. Y.) Street Railway.**—The Public Service Commission for the Second District of New York has reserved decision on the application of the Dunkirk Street Railway, operated under lease by the Buffalo & Lake Erie Traction Company, for approval of a declaration of abandonment of portions of the route in the city of Dunkirk.

**El Paso (Tex.) Electric Company.**—Stone & Webster are offering at 97½ and interest, to yield about 6.94 per cent, a new issue of $300,000 of three-year 6 per cent gold coupon notes of the El Paso Electric Company, dated Aug. 1, 1917, and due Aug. 1, 1920. The notes are in $1,000, $500 and $100 denominations, and are callable as a whole at 100 and interest on any interest day upon sixty days' notice. The proceeds will provide funds for additions and improvements. The company owns all of the securities of the companies doing the entire electric lighting, commercial power and street railway business in El Paso, Tex., and Juarez, Mexico, and operating an electric railway between El Paso and Ysleta. The population served approxinmates 93,000.

**Interborough Rapid Transit Company, New York, N. Y.**—The Public Service Commission of the First District of New York has issued an order authorizing the Interborough Rapid Transit Company to issue $23,053,000 of 5 per cent bonds, dated June 1, 1913, and maturing on June 1, 1966. The bonds are to be issued by the company as of March 20, 1913, and are to be sold to net not less than 93.5 per cent. The proceeds of the bonds, to the extent of $21,554,290, are to be applied to meet the cost of equipment of new rapid transit lines operated by the company, while the remaining $1,498,710 of face value is to cover the expenses of the sale of the bonds and the discount. A large part of the new bond issue is made necessary by increased costs not foreseen in the original dual system estimates of 1913. The commission has also resettled an order of May 25, 1917, at which time it permitted the company to issue bonds for $11,436,000 for the cost of plant, structure and equipment of third and additional tracks upon the elevated lines by increasing the amount upon further application to $16,436,000.

**Lehigh Valley Transit Company, Allentown, Pa.**—The following notice has been sent by the Girard Trust Company to holders of certificates of deposit issued for stock of the Lehigh Valley Transit Company: "The Electric Bond & Share Company having exercised its option, under the agreement dated Feb. 7, 1917, to purchase the preferred and common stock of the Lehigh Valley Transit Company, and having paid to the depositary $48 per share for each share of preferred stock and $28 per share for each share of common stock deposited, you are hereby notified to present your certificate of deposit, properly indorsed in blank, to receive payment therefor."

**Memphis (Tenn.) Street Railway.**—The Tennessee Railroad Commission has reduced the assessment of the Memphis Street Railway for the years 1917 and 1918 from $4,514,380 to $4,230,200, or $284,180, over the protest of the county. It is reported that the county will carry the matter before the State Board of Equalization in September. The claim of the attorneys for the company was based on loss of revenue through jitney competition of last year, increased expenses occasioned by street paving, demand by the public for more and better cars, extension of lines in sparsely settled territory and the increased cost of coal and other material.

**Middle West Utilities Company, Chicago, Ill.**—A syndicate consisting of the Illinois Trust & Savings Bank, Russell Brewster & Co., McCoy & Company, Halsey Stuart & Company of Chicago, and A. H. Bickmore & Company of New York, is offering at 97¾ and interest $1,000,000 of three-year 6 per cent collateral gold notes, series "A," of the Middle West Utilities Company. The notes are secured by deposit of securities in the aggregate principal amount of 120 per cent of all notes outstanding. The notes are dated July 1, 1917, and are redeemable all or in part at 100 and interest at any time upon sixty days' notice. They are in denominations of $1,000, $500 and $100.

**Reading Transit & Light Company, Reading, Pa.**—William B. Bonbright & Company, New York, N. Y., have purchased an issue of $2,300,000 two-year 6 per cent secured notes of the Reading Transit & Light Company, subject to the approval of the Public Service Commission of Pennsylvania, and an advance offering is to be made. The purpose of the issue is to provide in part for the acquisition of all the outstanding common stock of the Metropolitan Edison Company of Reading and Lebanon, and the property of the United Traction Company, which owns or controls lines in and about Reading, all of which were heretofore held under leaseholds. The notes are secured by the deposit with the trustee of $3,000,000 of Reading Transit & Light Company general and refunding mortgage thirty-year 5 per cent bonds and all of the outstanding $3,000,000 of common stock of the Metropolitan Edison Company.

**Seattle, Renton & Southern Railway, Seattle, Wash.**—Judge A. W. Frater, in the Superior Court, Seattle, Wash., recently signed an order dismissing the receivers, Scott Calhoun and Joseph Parkin, of the old Seattle, Renton & Southern Railway. The receivers were appointed in connection with the case of William R. Crawford, which has been in court for five years. The court allowed the receivers, in addition to their salaries of $12,000, $5,195 for personal expenses. The remainder of the funds available is to be paid over to the new owners of the road.

**Seattle (Wash.) Municipal Street Railway.**—The municipal street railway system in Seattle was operated during the month of June at a loss of $2,361, making a total loss of $111,251 to date. June was the first month of the fourth year of operation.

**Terre Haute & Merom Traction Company, Terre Haute, Ind.**—Philip Lahr has been reinstated receiver of the Terre Haute & Merom Traction Company by Judge John W. Gerdink in the Terre Haute Superior Court. He was appointed receiver several years ago as the result of the filing of the case of Don M. Roberts against the company and was discharged in 1914. The company, it is said, is the owner of some property and steel rails which can be sold, and it was asked that Mr. Lahr be reinstated so that he could dispose of the parcels.

## Electric Railway Monthly Earnings

| Period | Operating Revenue | Operating Expenses | Operating Income | Fixed Charges | Net Income |
|---|---|---|---|---|---|
| BERKSHIRE STREET RAILWAY, PITTSFIELD, MASS. | | | | | |
| 1m., June, '17 | $91,446 | *$90,812 | $634 | $27,557 | †‡$26,901 |
| 1 " " '16 | 82,913 | *52,328 | 30,585 | 27,850 | ‡2,907 |
| 6 " " '17 | 510,250 | *454,190 | 56,060 | 165,483 | †‡108,926 |
| 6 " " '16 | 458,221 | *388,497 | 69,724 | 150,660 | †‡79,756 |
| CONNECTICUT COMPANY, NEW HAVEN, CONN. | | | | | |
| 1m., June, '17 | $861,397 | $656,201 | $205,196 | $95,457 | ‡$132,011 |
| 1 " " '16 | 816,940 | 501,178 | 315,762 | 101,524 | ‡206,507 |
| 6 " " '17 | 4,763,660 | 3,788,687 | 974,973 | 574,995 | ‡503,941 |
| 6 " " '16 | 4,495,551 | 3,079,714 | 1,415,837 | 591,446 | ‡930,082 |
| FEDERAL LIGHT & TRACTION COMPANY, NEW YORK, N. Y. | | | | | |
| 1m., May, '17 | $206,448 | *$149,350 | $57,098 | $44,642 | $12,456 |
| 1 " " '16 | 194,772 | *136,515 | 58,257 | 48,592 | 9,665 |
| 5 " " '17 | 1,138,905 | *753,023 | 385,882 | 243,077 | 142,805 |
| 5 " " '16 | 1,056,561 | *711,357 | 345,204 | 243,988 | 101,216 |
| LEHIGH VALLEY TRANSIT COMPANY, ALLENTOWN, PA. | | | | | |
| 1m., June, '17 | $248,707 | *$162,729 | $85,978 | $51,351 | ‡$45,513 |
| 1 " " '16 | 206,616 | *125,222 | 81,394 | 50,571 | ‡41,115 |
| 12 " " '17 | 2,671,669 | *1,750,275 | 921,394 | 625,192 | ‡446,228 |
| 12 " " '16 | 2,333,408 | *1,386,050 | 947,358 | 635,888 | ‡442,676 |
| NEW YORK & STAMFORD RAILWAY, PORT CHESTER, N. Y. | | | | | |
| 1m., June, '17 | $38,780 | *$33,139 | $5,641 | $7,982 | †‡$2,302 |
| 1 " " '16 | 36,597 | *25,462 | 11,135 | 7,979 | ‡3,193 |
| 6 " " '17 | 174,559 | *170,865 | 3,694 | 47,908 | †‡43,949 |
| 6 " " '16 | 168,251 | *143,300 | 24,951 | 47,900 | †‡22,711 |
| NEW YORK, WESTCHESTER & BOSTON RAILWAY, NEW YORK, N. Y. | | | | | |
| 1m., June, '17 | $46,282 | *$44,912 | $1,370 | §$11,338 | †‡$9,252 |
| 1 " " '16 | 44,886 | *45,436 | †550 | §23,434 | ‡11,379 |
| 6 " " '17 | 274,446 | *277,223 | †2,777 | §46,688 | †‡43,146 |
| 6 " " '16 | 256,190 | *304,369 | †48,179 | §55,954 | †‡60,951 |
| REPUBLIC RAILWAY & LIGHT COMPANY, YOUNGSTOWN, OHIO | | | | | |
| 1m., June, '17 | $375,345 | *$254,386 | $120,959 | $80,514 | ‡$44,747 |
| 1 " " '16 | 321,024 | *188,705 | 132,319 | 68,579 | ‡64,083 |
| 12 " " '17 | 4,283,069 | *2,688,804 | 1,594,265 | 907,876 | ‡719,560 |
| 12 " " '16 | 3,598,296 | *2,112,749 | 1,485,547 | 755,680 | ‡742,086 |
| RHODE ISLAND COMPANY, PROVIDENCE, R. I. | | | | | |
| 1m., June, '17 | $511,983 | *$412,343 | $99,640 | $121,123 | ‡$5,399 |
| 1 " " '16 | 500,107 | *313,402 | 186,705 | 122,158 | ‡91,950 |
| 6 " " '17 | 2,829,690 | *2,364,658 | 465,032 | 718,154 | †‡169,333 |
| 6 " " '16 | 2,728,612 | *2,021,860 | 706,752 | 679,781 | ‡111,797 |
| SAVANNAH (GA.) ELECTRIC COMPANY | | | | | |
| 1m., May, '17 | $74,213 | *$52,139 | $22,074 | $24,144 | †$2,070 |
| 1 " " '16 | 64,343 | *44,401 | 19,942 | 23,688 | †3,746 |
| 12 " " '17 | 877,833 | *582,620 | 295,213 | 285,654 | 9,559 |
| 12 " " '16 | 785,175 | *526,525 | 258,650 | 279,246 | †20,596 |
| TAMPA (FLA.) ELECTRIC COMPANY | | | | | |
| 1m., May, '17 | $82,012 | *$48,366 | $33,646 | $4,370 | $29,276 |
| 1 " " '16 | 72,781 | *46,209 | 26,572 | 4,394 | 22,178 |
| 12 " " '17 | 992,882 | *539,245 | 453,637 | 52,281 | 401,356 |
| 12 " " '16 | 978,851 | *519,135 | 459,716 | 52,238 | 407,478 |
| TWIN CITY RAPID TRANSIT COMPANY, MINNEAPOLIS, MINN. | | | | | |
| 1m., June, '17 | $853,195 | $541,990 | $311,205 | $145,846 | $165,359 |
| 1 " " '16 | 853,190 | 511,481 | 341,709 | 140,000 | 201,709 |
| 6 " " '17 | 5,175,944 | 3,406,572 | 1,769,372 | 877,511 | 891,861 |
| 6 " " '16 | 5,009,415 | 3,142,623 | 1,866,792 | 853,387 | 1,013,404 |
| WESTCHESTER STREET RAILROAD, WHITE PLAINS, N. Y. | | | | | |
| 1m., June, '17 | $22,667 | $24,583 | †$1,916 | $2,193 | †‡$4,081 |
| 1 " " '16 | 22,880 | 22,589 | 291 | 1,808 | †‡1,489 |
| 6 " " '17 | 115,196 | 136,702 | †21,504 | 12,450 | †‡33,790 |
| 6 " " '16 | 118,534 | 127,369 | †8,835 | 10,558 | †‡19,240 |

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*Includes taxes. †Deficit. ‡Includes non-operating income. §Excludes interest on bonds, charged income and paid by the New York, New Haven & Hartford Railroad under guarantee; also interest on notes held by the New York, New Haven & Hartford Railroad, not credited to income of that company.

# Traffic and Transportation

## Trenton Company Loses Fare Case

### Supreme Court of New Jersey Upholds Effort of City to Prevent Withdrawal of Six-for-a-Quarter Tickets

As noted briefly last week the Trenton & Mercer County Traction Corporation, Trenton, lost its case in the Supreme Court of New Jersey, to which it had appealed for permission to abandon the sale of six tickets for 25 cents. Under a writ of certiorari the company carried to the Supreme Court the order of the Utility Board forbidding it to put into effect the proposed withdrawal of the tickets. The Supreme Court states that the withdrawal of tickets would be an increase of an existing rate under which 82 per cent of the passengers carried paid a fare of 4 1/6 cents. By the proposed withdrawal they would be required to pay a fare of 5 cents. The court's decision, however, can be appealed to the Court of Errors and Appeals. The company has pending in the federal courts an action to test the sale of tickets on constitutional grounds.

The writ of certiorari reviewed two orders of the Public Utility Commission. One was dated Aug. 17, 1915, and suspended the proposed abolition of the tickets, and the other dated Jan. 16, 1916, and permanently ordered the company, after a hearing, not to make the change.

The practice of selling tickets was inaugurated twenty-two years ago, but the company endeavored to change the plan in 1909. After negotiations in 1909, an ordinance was passed by the city requiring the tickets. The company agreed to the ordinance in advance, in writing, and promised to accept by a confirmatory agreement after the measure had been passed. The confirmatory agreement was never actually executed.

Justice Swayze says that the Supreme Court found it unnecessary to pass upon the question whether the original ordinances and their acceptance amounted to a contract by which the companies were authorized to charge as much as 5 cents, or whether they amounted only to a limitation by which the companies were forbidden to charge more than 5 cents. The consideration of the reasonableness of ticket selling was also omitted.

In referring to the understanding about the ordinance, on the faith of which the city passed the measure, Justice Swayze said:

"Had the agreement been signed by the officers of the company no question could have arisen."

The directors of the company held that the ordinance permitted of alterations whenever demanded in the judgment of the Common Council, and that this was a false understanding. On this point the court remarked:

"It is a little difficult to understand upon what theory it is supposed the false recital vitiates the action of the company. It is not charged that the city did anything to mislead the company in this respect. Manifestly the company ought not to be permitted for its own mistake to withdraw from the agreement after the city had acted thereon.

"There was sufficient legal consideration for the agreement by the company. It is true that the ordinance did not affirmatively concede any benefit to the company, on its face was rather a detriment; but that is too narrow a view to take . . . the benefit to the company was what the ordinance omitted, not what it contained."

To the allegation that the Mercer County Traction Company and the Hamilton & Ewing Traction Company could not be affected by the ordinance because no official action was taken by either with reference to its terms, the court comments:

"This argument overlooks the fact that both these companies were at the time under lease to the Trenton Street Railway for a term of which more than 990 years was still to come. The probability of the two lessor companies being affected prejudicially by the ordinance is negligible."

## Six Cents Proposed for Oil City

### Citizens' Traction Company Would Charge 6 Cents and Introduce Workingmen's Tickets—Company's Service Commended

The Citizens' Traction Company, Oil City, Pa., proposes to begin charging a 6-cent fare on its lines in Oil City and Franklin on Sept. 1. The company has filed tariffs to this effect with the Public Service Commission of that State. To offset inconvenience to patrons in paying 6 cents instead of a nickel, special workingmen's tickets will be issued in books of eighteen tickets for $1 or ninety tickets for $5. These will be accepted for one cash fare on all lines of the company. In a formal statement on the necessity for the increase, J. H. McClure, general manager of the company, said:

"Confronted by a situation which threatens the impairment, not only of the capital invested, but of its services to the public, the Citizens' Traction Company has moved to secure an increase in rates, which will at least give it some relief and which has been forced upon the company by the constantly rising prices of materials, taxes and labor. This step is absolutely imperative and is in line with the tendency of the times in other industries, many of which directly affect this company. The conditions which have brought about this situation threaten bankruptcy for electric railways in general, and in this case menace the ability of the company to provide the service which is so necessary to Oil City, Franklin and vicinity. This action has been caused by present conditions which have disorganized all values the world over."

#### PUBLIC'S ATTITUDE APPARENTLY FAVORABLE

Although the property is being operated under a franchise which calls for a maximum fare of 5 cents, officials of the company do not anticipate that the application will be denied. According to several local newspaper reports following the announcement of the company's proposal, the public seems to accept the move very much in a co-operative spirit. The request for more revenue was not a surprise, for many in close touch with the development of the local property had already questioned its ability to continue against the rising costs of operation. Evidently the citizens of Oil City and vicinity are satisfied with their electric railway service and stand ready to help in having that service maintained.

Speaking editorially of the present national conditions and their effect on the electric railway field generally, the Oil City *Blizzard* says:

"That the local concern has been hard hit, there seems to be no doubt. That it costs more than 5 cents to haul each passenger is the patent fact that makes some action necessary. If, under the abnormal conditions of war times, with no relief in sight, the company is giving a service at less than cost, it must raise its charges proportionately.

"An electric railway is a public service corporation. Its chief end is public service. When it fails to give adequate service, either in quantity or quality, the public has a right to demand to know the reason why. On the other hand, the public must return to the company an adequate recompense for the service rendered. If the fare is not enough to do this, then—in justice to public and to company alike—the fare must be increased."

Similarly, the Oil City *Derrick*, under the title "To Every One His Due," commented on the proposed increase as follows:

"The proposal of the Citizens' Traction Company to increase its fares to 6 cents is in accord with the general advance in the price of all articles, and as the company's detailed statement shows, seems to be essential to the continuance of good service. Under such conditions there can be no ground for complaint from anyone.

"Citizens of Oil City are proud of their electric railway system, of its comfortable cars and frequent schedule; they would be loath to have its service changed. But a public service corporation cannot serve the people unless it is given adequate return. If the 5-cent charge for service was fair in 1910, it obviously is not reasonable to-day, when every item entering into the business has increased in cost."

## Improved Service on Bay State

### Company Contemplates the Use of One-Man Cars Besides a General Program of Car Replacements

The Bay State Street Railway on Aug. 1 filed with the Public Service Commission of Massachusetts a request for permission to operate all-automatic one-man cars on some of its lines. This step by the company marks its efforts to reduce the cost of operation and at the same time maintain a good standard of service. President P. F. Sullivan made the following statement in this connection:

"We are especially interested in these cars because they will enable us to give satisfactory service economically. The use of cars of this kind is in line with the suggestions of the Public Service Commission and with our policy to give the best service at the lowest possible cost. We are trying in every way to cut down expenses—something these one-man cars will assist us to do."

The company has also filed with the commission a statement of equipment to be replaced. It will place in operation 200 new double-truck cars as fast as they are received from the manufacturer. The first of these cars has arrived and will soon be placed in service in Lynn. In the interests of better service 297 old cars will be scrapped, which, together with forty-one horse cars and thirty-nine snowplows which will also be scrapped, are valued at $989,507. Recently thirty-seven reconstructed cars were put in commission, and as soon as the financial condition of the road will permit, other cars will be reconstructed and changed for prepayment operation, which will bring the total number of reconstructed cars up to 200. This is part of the Bay State's general betterment plan.

## Skip Stop Extended in Buffalo

The skip-stop plan of operation on the city lines of the International Railway, Buffalo, N. Y., has been extended to the West Utica, Abbott-South Park and Broadway lines. Elk Street cars operating over the Abbott-South Park line from Main and Perry Streets to Elk Street and the Abbott Road will also skip stops. Officials of the company, coöperating with the municipal traffic commission, have made a thorough study of the skip stop on the two initial skip-stop lines, Main Street and Elmwood Avenue, and have found that it has greatly reduced the running time of cars and has made it much easier to maintain schedules. The estimated saving of time on a one-way trip on the West Utica-Abbott-South Park lines is twelve minutes and on a one-way trip on the Broadway line, six minutes.

## Commission's Authority Denied

### Circuit Court Holds Commission Cannot Change Rates of I. U. T. Company, Fixed by Contract

Judge J. F. Charles in the Circuit Court of Grant County, Indiana, has ruled that the Public Service Commission of Indiana has no authority to change a rate which has been fixed by contract between a traction company and a county. The court held that the county has he right to make a contract with the traction company for certain fares between specified points and that the State has no right to change the contract. The case grew out of an agreement between the Union Traction Company of Indiana and Grant County by which fares between points in the county were fixed. The company was auhorized by the commission in March, 1916, to increase hese specified fares to a flat rate of 2 cents a mile. The own of Fairmount and Grant County thereupon brought separate suits against both the traction company and the commission. The company has been charging the inreased rate since April, 1916, and the present ruling on demurrer will not bring back at once the old rates.

The plaintiffs in the two actions have obtained a rule o answer against the defendants and will ask a judgment f the case stands on the rulings on demurrer. If the next tep is a trial of the issues, evidence will be submitted. t is said that the case is one which the Supreme Court may be called upon to decide.

## Girl Employed as Station Agent

Some difficulty has been experienced by the Cleveland, Southwestern & Columbus Railway, Cleveland, Ohio, in maintaining competent agents at several stations, owing to the greater inducements attracting the men to industrial positions. Recently a vacancy occurred at Elyria, which is the company's largest office with the exception of that at Cleveland, and E. F. Schneider, general manager of the company, decided to give Miss Emma Sharfenberg a trial at the work. In this position it is her duty not only to act as ticket agent but to serve as cashier for the entire Western division, since all conductors on that division turn in at Elyria.

The young lady had been employed for about a year as clerk in the office of the local superintendent in Elyria, where she proved to be unusually efficient. She has now been acting as the Elyria agent for two months and is said to be doing the work very successfully. Baggage is handled by the electric package crew at this point, so her duties do not include any work for which a woman would be physically unqualified. This is the first important position the Southwestern Company has intrusted to a woman, although a lady agent has been employed at Crestline, a small station, for a long time.

**Monmouth County Reduces Fare.**—The Monmouth County Electric Company, Red Bank, N. J., has reduced its fare between Long Branch and Red Bank from 15 cents to 10 cents. The question of reduction of fare has been under consideration for a long time, having been taken up by the Chamber of Commerce on several occasions.

**Louisville Traction Revises Tariff.**—The Louisville (Ky.) Traction Company, operating through electric service between Louisville and Indianapolis, Ind., has completed a revision of its local fares. The rate between terminals has not been affected but the local rates have been changed to correspond with the rates of competing steam roads and are based on 2 cents a mile.

**Railways to Exchange Transfers.**—The Seattle & Rainier Valley Railway and the Seattle (Wash.) Municipal Street Railway has each agreed to honor transfers of the other company. The agreement is to be permanent and was arranged by Walter M. Brown, general manager of the railway company, and A. L. Vanetine, superintendent of public utilities.

**Fare Increase Asked by Small Illinois Road.**—The Galesburg & Kewanee Electric Railway, Kewanee, Ill., a 14-mile line connecting Kewanee, Wethersfield and Galva, Ill., has issued tariffs, effective Sept. 1, increasing the city fare from 5 cents to 7 cents, and also the interurban zone fares from 5 cents to 7 cents. These are the principal increases asked for, although various ticket rates have also been advanced in the new tariff.

**Auto-Bus Line to Army Post.**—Satisfactory traffic arrangements have been made by the city of Tacoma, Wash., and Pierce County authorities with the bus drivers operating to the American Lake army post. Bus men will be organized into an auto-bus company, with stringent rules as to regulation of traffic on the army post highway. Before the conference of the men with the city and county authorities, there had been numerous complaints of violations of the State traffic law.

**Six-Cent Fare Wanted in Dover.**—The Dover, Somersworth & Rochester Street Railway, Dover, N. H., proposes to raise its fare from 5 cents to 6 cents in each fare zone, effective Aug. 20. Its new schedule has been filed with the Public Service Commission of New Hampshire. F. E. Webster, treasurer of the company, states that the road is obliged to make the increase because of the steady increase in operating expenses. It is said that the Dover Board of Trade will protest the action.

**Segregation of Passengers Ordered.**—The Mayor of Oklahoma City, Okla., supported by the City Commission, has ordered the chief of police and all his officers to see that the electric railways operating in Oklahoma City, hereafter strictly enforce the "Jim Crow" law. This action follows a recent assault on the conductor and the motorman of an electric railway car on the Fair Park line, which was the outgrowth of an attempt of negroes to ride in that section of the car reserved for white passengers.

**Information Booklet for Birmingham.**—A well-illustrated booklet, entitled "Playgrounds," including a list of car schedules of the Birmingham Railway, Light & Power Company, Birmingham, Ala., has just been issued by that company. The folder is made in the form of a railway time-table and contains much interesting information about points of interest in Birmingham and adjacent towns. A map of the electric railway system of the district is also included.

**Open Trailers Permitted by Lifting Military Order.**—The Louisville & Southern Indiana Traction Company, New Albany, Ind., has resumed use of trailers on its Louisville-Jeffersonville and Jeffersonville-New Albany lines. As noted in the ELECTRIC RAILWAY JOURNAL for July 7, page 37, an order issued by the military authorities prohibiting cars from crossing bridges over navigable streams with windows open made it necessary to abandon the use of open trailers. Now that that order has been rescinded the open cars are used to the satisfaction of patrons of the company.

**I. R. T. Withdraws Free Transportation.**—The privilege of free transportation on the subway and elevated lines of the Interborough Rapid Transit Company, New York, which was extended to members of the National Guard of New York on April 3, was withdrawn upon the mustering of the National Guard into the federal service. Theodore P. Shonts, president of the company, explained that the privilege could no longer be extended, there being a federal statute forbidding the acceptance of voluntary service for the government except in cases of sudden emergency involving the loss of human life or the destruction of property.

**Freight and Express Service Planned for Poughkeepsie.**—Tentative plans are being considered for an express and freight service on the Poughkeepsie City & Wappingers Falls Electric Railway, Poughkeepsie, N. Y., to give through deliveries to the boats, railroad stations, Vassar College and the State Hospital at Poughkeepsie. With the development of the Standard Aniline Products factory at Wappingers Falls there is a growing demand for quick transportation from that factory to the forwarding facilities at Poughkeepsie. It is said that the matter is only contemplated, however, as investigations are being conducted to ascertain whether necessary arrangements can be made and whether the company can enter the business profitably.

**Railway Wants List of Licensed Jitneys.**—The Washington Railway & Electric Company has requested the District of Columbia Public Service Commission that it be furnished a list of all licensed jitney operators, together with the routes traversed and the rates and schedules maintained. Since the recent railway strike in Washington more than 400 jitney licenses have been issued and the commission is preparing to investigate the situation. In its letter to the board the company asked if any steps are in contemplation to require the jitney men to give bond as a protection to patrons in cases of accident and to prevent overcrowding. The company objects to the jitneys paralleling its lines, which was permitted as an emergency measure during the strike, and claims that it is fully able to handle the traffic in its territory.

**Illinois Company Fare Increase Upheld.**—The new schedule of rates on the interurban division of the Chicago & Joliet Electric Railway, Joliet, Ill., which was approved by the Illinois Public Utilities Commission after a hearing and went into effect on July 1, has been upheld by the Circuit Court. J. R. Blackhall, general manager of the company, reports that although the new rates are considerably higher than the old ones, they have not in any way affected the volume of traffic. The city of Lockport took an appeal from the order of the commission to the Circuit Court of Sangamon County and, as the case could not be heard until the September term of court, the city asked for a stay order suspending the tariff until that time. The hearings on the stay order came up on July 30, and the court denied the petition. The company anticipates no difficulty in connection with the trial, which will not be held until the latter part of the year.

**Spokane Trainmen Oppose Jitneys.**—Trainmen of the Washington Water Power Company of Spokane recently circulated on the cars for patrons' signatures a petition which was addressed to the Mayor and city. The petition read in substance as follows: "We petition your honorable body that if the jitney buses are to be permitted to run on the streets of the city you confine their operation to streets not already served by electric railway cars. We believe that former experience with jitneys has shown that the competition among them, and between them and the street cars, makes the streets occupied by both dangerous to the public and gives a duplication of service to those streets to the neglect of streets not served by the cars. We also believe that if there is a demand for more transportation service the interests of all would be better served and protected if additional transportation facilities were not allowed on streets which are already served by electric railways."

**Reduction of Service Proposed.**—The Public Service Commission for the First District of New York is conducting an investigation as to the merits of an application by the Staten Island Rapid Transit Railway, a steam road, for permission to eliminate eighty-eight trains on its north and south shore divisions. The service it is proposed to eliminate consists of trains which have been operated late at night and in non-rush hours. The company contends that the trolley lines which parallel the road are sufficient to care for all the traffic. The Richmond Light & Railroad Company, the adjacent electric railway, has agreed, in the event that the commission acts favorably on the application, to provide additional facilities. At a hearing before the commission on Aug. 7 the case was adjourned to Sept. 5. The commission has in mind the stress of the present times and, while not wishing to curtail the service to the public, especially that which is necessary, is desirous to co-operate with the government in conserving the transportation facilities of the country.

**Ohio Road Has Large Special Car Business.**—During the year 1916, 542 special cars were chartered from the Cleveland, Southwestern & Columbus Railway, Cleveland, Ohio, or an average of forty-five cars a month. This business brought in an average gross revenue of $20.30 a car. A good many of these special cars were ordered for short trips. The company requires a minimum of fifty passengers and issues special-rate tickets good only on the special car. The contract signed by the person chartering the car calls for the payment of a certain sum for fifty persons or less and so much per passenger for all over fifty. It also specifies that the car must be paid for in advance, not less than twenty-four hours before it is to run, otherwise the contract is declared void. The company's funeral car was frequently chartered and this is included in the above total. The remainder of the business came from various clubs, from parties going to the resorts and from the colleges at Oberlin and Wooster for athletic teams and theater parties. Some advertising was carried in the college papers for this last-named business, but the remainder came very largely unsolicited.

**"Be Careful" Campaign Launched.**—Another far-reaching campaign is being conducted in the interest of public safety by interests in Philadelphia, Pa. It is termed a "Be Careful" campaign and is supported by more than 150 manufacturing interests, financial institutions, public service corporations, insurance companies, firms and individuals. Full-page advertisements are published in local papers calling attention to the hundreds of killed and wounded on electric railways and steam roads in Pennsylvania in 1916, most of whom were trespassers and careless pedestrians. The people are urged to exercise more care to prevent the little accidents that arise from simple dangers and in that way to reduce the number of fatalities or bodily losses which make life a burden. Among the companies supporting the campaign are: the Philadelphia Rapid Transit Company, the Trenton, Bristol & Philadelphia Street Railway, and the Philadelphia Electric Company. Several individuals also are interested, among whom are: Samuel T. Bodine, president of the United Gas Improvement Company; John Gribbel, vice-president of the American Railways, and John A. Rigg, president of the Interstate Railways.

# Personal Mention

**R. A. Wilson** has been appointed treasurer of the Quebec Railway, Light, Heat & Power Company, Ltd., Quebec, P. Q.

**John M. Reifsnider** has been appointed a member of the Public Service Commission of Maryland in place of P. D. Laird, resigned.

**C. H. Byers** has been appointed district engineer of the division of valuation of the Interstate Commerce Commission, Pacific district. W. H. Davisson was appointed assistant district engineer.

**Frank I. Hardy**, general manager of the Chicago, South Bend & Northern Indiana Railway, has been appointed general superintendent of the Northern Ohio Traction & Light Company, with offices at Akron, Ohio.

**C. O. G. Miller**, a member of the board of directors of the San Francisco-Oakland Terminal Railways, Oakland, Cal., has been elected president pro tem of that company, filling the vacancy which has existed since G. K. Weeks resigned from the presidency last September. Mr. Weeks is still on the board of directors.

**George Scott**, chief engineer of power stations for the Moncton Tramways, Electricity & Gas Company, Ltd., Moncton, N. B., has been appointed superintendent of the company to succeed A. B. Coryell. Mr. Scott has been in the service of the company in various capacities for several years. Mr. Coryell, as reported in this paper recently, resigned to enter private business in Buffalo, N. Y.

**Howard H. George**, formerly assistant engineer under Martin Schreiber, who is chief engineer of the Public Service Railway, Newark, N. J., reviewed his training camp experiences in a communication which appeared in the July issue of the *Trolley Weal*, that company's publication. Mr. George has the rank of first lieutenant in the Officers' Reserve Corps, and has been on active duty since early in May.

**Fred W. Proctor**, city engineer of North Adams, Mass., has resigned to become engineer of the Berkshire Street Railway, Pittsfield, Mass. Mr. Proctor was graduated from Tufts College in Massachusetts, and was for several years a member of the engineering staff of the Boston & Maine Railroad. After serving several years as assistant city engineer at North Adams, he became superintendent of streets and in 1914 was made city engineer.

**J. R. Blackhall**, general manager of the Chicago & Joliet Electric Railway, Joliet, Ill., and president of the Universal Concrete Products Company, has resigned his official position with the latter company, but will continue as a director. Mr. Blackhall was active in the development and marketing of the concrete pole manufactured by this company by the centrifugal process. The separation of the manufacturing company office in Chicago and the railway company office in Joliet made it difficult to do justice to both duties, and Mr. Blackhall has, therefore, concluded to devote his entire attention to the railway position.

**F. Kingsley**, associate editor of the ELECTRIC RAILWAY JOURNAL, has been granted indefinite leave of absence to take up his duties as First Lieutenant of Ordnance, Officers' Reserve Corps. He was ordered into active service on Aug. 10, 1917. Mr. Kingsley was graduated from the mechanical engineering department of Cornell University in 1900. He served as apprentice and machinist in the locomotive shops of several western railroads and later was general foreman of the Helena shops of the Northern Pacific Railway. Following this he was connected with Westinghouse Church Kerr & Company for five years in power station and shop construction and equipment work. He became a member of the editorial staff of this paper in January, 1912.

**A. Kordick** has been appointed superintendent of the Milwaukee Division of the Milwaukee (Wis.) Northern Railway. Mr. Kordick has been connected with that company for the past eight years, and has been engaged in engineering work since the completion of his early education. He began at the age of fifteen as an oiler at the pumping station of the Sheboygan Waterworks. In the spring of 1907, three years later, he accepted the position of engineer of power stations for the Greensboro (N. C.) Electric Company, where he remained for one year and then returned to Sheboygan. In February, 1909, he entered the employ of the Milwaukee Northern Railway as substation operator and two years later received a position in the interurban train service. Mr. Kordick has been train dispatcher for that company since February, 1913.

**Albert Eastman**, vice-president and general manager of the Windsor, Essex & Lake Shore Rapid Railway, Kingsville, Ont., was elected vice-president of the Canadian Electric Railway Association at its recent annual meeting. Mr. Eastman entered transportation service in 1889 and remained for about twelve years in the steam railroad field. He then served in various capacities the Detroit (Mich.) United Railway and in November, 1903, became superintendent of employment for the Public Service Corporation of New Jersey. Four years later Mr. Eastman was appointed general express and passenger agent of the Syracuse and Utica lines of the New York State Railways, and in May, 1910, he accepted his present position as general manager of the Windsor, Essex & Lake Shore Rapid Railway. He was elected vice-president of the company in 1914.

**J. C. Nelson** has been appointed general manager of the Empire United Railways, Inc., Syracuse, N. Y., to succeed T. C. Cherry. Mr. Nelson was graduated from the University of Alabama in the civil engineering department and afterwards took a special course in civil and electrical engineering at Cornell University. In the year 1902 he became connected with Ford, Bacon & Davis, engineers, New York, N. Y., with whom he has been associated since that time. He was at first employed in the construction department of properties in the South operated by that firm and later was engaged in their New York office organization on construction, valuation and the making of investigations of the operation of public utilities. Mr. Nelson then entered the operating field in May, 1916, when he was appointed general manager of the Gary & Interurban Railroad at Gary, Ind., to succeed A. C. Miller. From there he was transferred by Ford, Bacon & Davis to Syracuse to his present position of general manager of the Empire United Railways, Inc.

J. C. NELSON

**William J. Lynch**, who, as reported recently, has been appointed general manager of the Quebec Railway, Light, Heat & Power Company, Ltd., Quebec to succeed the late H. G. Matthews, has been in the service of that company and its predecessors for twenty years. Mr. Lynch was born in 1882 and began his commercial career in 1897 when he entered the employ of the Montmorency Electric Power Company as office clerk. Two years later he was appointed cashier when that company was amalgamated with the Quebec, Montmorency & Charlevoix Railway and the Quebec District Railway. He was later promoted successively to the positions of accountant and treasurer, and in 1909, when the public utilities in the city of Quebec and vicinity were merged, he was appointed treasurer and comptroller, the position he occupied until the time of his recent promotion. The Quebec Railway, Light, Heat & Power Company, Ltd., controls the following companies: The Quebec Railway, Light & Power Company, the Quebec-Jacques Cartier Electric Company, the Canadian Electric Light Company, the Quebec Gas Company, the Frontenac Gas Company, the Quebec County Railway and the Lotbiniere & Megantic Railway. Mr. Lynch's popularity in the community and his long connections with utility problems will no doubt prove very helpful in the execution of his new and responsible duties.

# Construction News

Construction News Notes are classified under each heading alphabetically by States.

An asterisk (*) indicates a project not previously reported.

## RECENT INCORPORATIONS

**Muscle Shoals Traction Company, Florence, Ala.**—Incorporated to construct the proposed interurban railway from Florence to Huntsville, via St. Floraine, Bailey Springs, Killen, Center Star, Rogersville and Athens, 64 miles, with a branch to Lexington, about 12 miles. Officers: Solon L. Whitten, Chicago, president; Tracy W. Pratt, Huntsville, vice-president and treasurer, and Thurston H. Allen, secretary and general manager. [July 21, '17.]

***Alton & Edwardsville Railroad, Alton, Ill.**—Incorporated at Springfield to construct a line from Alton to Edwardsville, via East Alton, Blinn, Silver Ridge, Woodriver and Wanda. Capital stock, $6,000. The line will handle both passenger and freight business. Directors: Louis A. Schlafly, Phil M. Gervig, Henry S. Baker, Don A. Barrus and E. E. Wilson, Alton. It is stated that the project is backed by H. H. Ferguson, vice-president of the Illinois Terminal Railroad.

***Petersburg, Hopewell & City Point Railway, Petersburg, Va.**—Incorporated with a capital stock of $1,000,000. The company plans to acquire the Petersburg & Appomattox Electric Railway, operating from Petersburg to Hopewell, Va., 9 miles, and the Hopewell & City Point Railway, operating from Hopewell to City Point, about 2 miles. It is proposed to construct a branch line to Prince George Courthouse, 6 miles, and 2 miles of second track from Petersburg to Camp Lee, the new army cantonment near Petersburg. Officers: Richard Mann, Petersburg, president; J. L. Vaughn, Shawsville, Va., vice-president; L. W. Zimmer, secretary and treasurer, and H. E. Mason, auditor.

***Blacksville & Western Railway, Morgantown, W. Va.**—Incorporated to construct a line from Blacksville, W. Va., to Brave, Pa., about 5 miles. Capital stock, $25,000. Incorporators: Raymond E. Kerr, Charles A. Goodwin, Ammon I. Derr, C. S. Bailey and David E. Adams, all of Morgantown.

## FRANCHISES

**Long Beach, Cal.**—The Pacific Electric Railway has received a franchise from the city commissioners of Long Beach to lay a single-track, standard-gage line on Water Street to connect with the main line and serving the Craig Shipbuilding Company and other industrial establishments.

**Youngstown, Ohio.**—The Youngstown & Suburban Railway has received a franchise from the City Council to double-track its line on Front Street and South Avenue.

**Henryetta, Okla.**—An election has been called at Henryetta for Aug. 16 for the purpose of voting a franchise to the Henryetta, Dewar & Kusa Traction Company for the construction of an electric railway through the city. Morton Henderson, Kusa, is interested. [June 9, '17.]

**Easton, Pa.**—The Phillipsburg Transit Company has applied to the Public Service Commission of Pennsylvania for permission to operate at Easton and vicinity.

**El Paso, Tex.**—The El Paso Electric Railway has received a thirty-year franchise from the City Council to construct a line on Baltimore Street from Campbell Street to Madeline Park.

**Port Arthur, Tex.**—The Jefferson County Traction Company has asked the City Commission for a franchise authorizing the extension of its car line on another street, which would nearly double the street car mileage in Port Arthur.

**Tacoma, Wash.**—The Puget Sound Traction, Light & Power Company has asked the Board of County Commissioners for a twenty-five-year franchise to construct transmission lines in Pierce County.

**Tacoma, Wash.**—The city of Tacoma will be granted a twenty-five-year franchise by the Commissioners of Pierce County for the construction of a street car line on the tideflats. A few minor points in the contract are to be arranged before the franchise is signed. The time limit clause will provide that the Eleventh Street line be completed within six months, an extension up Hylebos Waterway to Lincoln Avenue made within sixteen months, and the line completed back along Lincoln Avenue to the city limits within twenty-four months.

## TRACK AND ROADWAY

**Alabama Power Company, Anniston, Ala.**—Plans are being considered by the Alabama Power Company for the construction of an extension to Camp McClellan.

**Pacific Electric Railway, Los Angeles, Cal.**—A new connecting link of the Pacific Electric Railway, joining Glendora and San Dimas, will soon be built, and will make the Los Angeles-Monrovia-Glendora line a through route to San Bernardino, by connection at San Dimas, over the Los Angeles, Pomona, Ontario and San Bernardino track.

**Oakland, Antioch & Eastern Railway, Oakland, Cal.**—The Railroad Commission of California has authorized the Oakland, Antioch & Eastern Railway to discontinue the operation of the line of the Sacramento Valley Electric Railroad extending from Dixon Junction to Dixon, 11 miles.

**Municipal Railway of San Francisco, San Francisco, Cal.**—It has been announced that the Church Street line of the Municipal Railway will be opened to traffic on Aug. 11.

**San Francisco-Oakland Terminal Railways, San Francisco, Cal.**—Work will be begun at once by the San Francisco-Oakland Terminal Railways improving its line on Telegraph Avenue, from Broadway to Fortieth Street, and College Avenue, from Broadway to the Berkeley line, at a cost of about $143,000.

**Southern Pacific Company, San Francisco, Cal.**—Under instructions from the City Council, City Attorney D. J. Hall has taken up with the Southern Pacific Company the matter of building the electric line on Butting Boulevard, for which the company obtained a franchise and made surveys some time ago.

**Peninsular Railway, San Jose, Cal.**—Work will be begun at once by the Peninsular Railway on the construction of an extension to the army cantonment at Palo Alto.

**Jacksonville (Fla.) Traction Company.**—An extension has been completed by the Jacksonville Traction Company to the industrial section of the city on the Talleyrand Avenue water front.

***Melbourne, Fla.**—It is reported that C. T. Miller, chief engineer, is making preliminary inspection of the proposed route of an electric railway from Melbourne to Tampa, via Haines City, Lake Alfred, Winter Haven, Lucerne Park and other points, 115 miles.

**Georgia Railway & Power Company, Atlanta, Ga.**—This company plans to construct about 5 miles of line to Camp Gordon, near Chamblee, Ga.

**Chicago, North Shore & Milwaukee Railroad, Highwood, Ill.**—Important improvements will be begun at once by the Chicago, North Shore & Milwaukee Railroad in Waukegan.

**Chicago & Joliet Electric Railway, Joliet, Ill.**—This company is reconstructing 1½ miles of single track on streets in the city of Joliet, where the city is putting in paving improvements. The railway company will pave its right-of-way with brick.

**Rockford & Interurban Railway, Rockford, Ill.**—This company will construct an extension to Camp Grant.

**Plymouth & Sandwich Street Railway, Plymouth, Mass.**—Operation has been begun by the Plymouth & Sandwich Street Railway over its completed line from Plymouth to Sagamore; also from Plymouth southward to the Cape towns. The line formerly operated to Manomet, and the work of extension has been carried on for the past few years. The road was completed late last spring. Eventually the line will be connected with that of the New Bedford & Onset Street Railway, via the route followed by the Cape Cod Canal.

**Grand Rapids (Mich.) Railway.**—Work has been begun by the Grand Rapids Railway repairing its street car tracks in the main thoroughfares of the city. The company plans to construct a downtown loop from Monroe Avenue to Michigan Street, probably on Ottawa Avenue N. W., to relieve the downtown streets of street car congestion. This will greatly facilitate street car traffic through the center of the city.

**Duluth (Minn.) Street Railway.**—A resolution has been introduced in the City Council granting the Duluth Street Railway temporary permission to install double tracks on the present Morgan Park line from Seventy-first to Eighty-fourth Avenue west on Grand Avenue. The new double track will take the place of the present single-track line operating beyond Fairmont Park into Morgan Park.

**Mesaba Railway, Virginia, Minn.**—This company contemplates replacing its wooden poles with steel towers.

**Binghamton (N. Y.) Railway.**—This company plans to construct an extension of its Stella line to Lester Avenue, connecting with the Main Street-Lester Avenue route.

**Panama Traction Company, Jamestown, N. Y.**—The Public Service Commission for the Second District of New York has approved the application of the Panama Traction Company to issue $150,000 in bonds and $60,000 of common stock. The money will be used to build the first link of the line between Ashville and Panama. The proposed line will connect with the main line of the Lake Shore Railway at Erie, Pa., with steamer service at Chautauqua Lake points. D. L. Davis, Jamestown, general manager. [April 28, '17.]

**Lake Shore Electric Railway, Cleveland, Ohio.**—It is reported that this company will construct a line to the Cromwell steel plant in Lorain.

**Ottawa (Ont.) Electric Railway.**—This company will reconstruct its track on Sussex Street from Rideau Street to St. Patrick Street with 80-lb. T-rail.

**Toronto (Ont.) Civic Railway.**—Work has been begun on the construction of an extension of the civic car line on Bloor Street from Quebec Avenue west to Runnymede Road. A single track will be laid on the north side of the street, thus allowing for future double track when required.

**Pacific Power & Light Company, Astoria, Ore.**—A contract has been awarded by the Pacific Power & Light Company for the reconstruction of a bridge for its car line in upper Astoria. The company will extend its terminals in upper Astoria 1 mile to reach the present city limits. Besides these improvements the company will spend $35,000 this year in other work in Astoria.

***Canton & Ohio River Railways, Pittsburgh, Pa.**—This company has been organized under the laws of Ohio and West Virginia by Cincinnati, Canton and Cleveland men for promoting a project to construct an electric railway from Canton, Ohio, to Wheeling, W. Va., via Toronto, Ohio. Executive offices have been established in Pittsburgh. It is authorized by its charter to issue stock to the amount of $10,000,000. The line as projected is 105 miles long.

**Pittsburgh (Pa.) Railways.**—The Pittsburgh Railways refusing to lay tracks on new Wheatland Street until final disposition of the city's complaint against it and its underlying companies before the Public Service Commission, the public works committee of Council in a resolution recently adopted instructed Director John Swan of the Department of Public Works to lay the track and complete the improvement of the street. The resolution instructed the director to prepare the proper ordinance for the issuance of bonds to provide money for the track-laying.

**Southern Traction Company, Dallas, Tex.**—Work has been begun by the Southern Traction Company on the construction of an extension of its line to Camp MacArthur.

**Seattle (Wash.) Municipal Railway.**—The Board of Public Works of Seattle has approved plans for the construction of a city street car line on Fifteenth Avenue N. W. and Leary Avenue to Market Street; also plans for changing Division A of the city line from double to single trolley. By this change enough copper will be obtained to build the line into the Ballard District. The new tracks will cost about $25,000 and the trolley changes will cost from $5,000 to $10,000.

**Wisconsin Interurban System, Madison, Wis.**—This company has filed with the Secretary of State a trust deed for $9,000,000 with the Chicago Title & Trust Company, as trustee. The deed, which is the basis for bond issues, embraces practically 250 miles of proposed and partly constructed lines with Madison as the hub of the system. The first line, upon which construction is promised by General Manager J. E. Jones of Portage, to begin at once, will connect Madison and Janesville by way of Stoughton and Edgerton. [July 21, '17.]

## SHOPS AND BUILDINGS

**Petaluma & Santa Rosa Railway, Petaluma, Cal.**—This company has awarded a contract to H. P. Vogensen, Petaluma, for the construction of a new station at Sebastapol.

**Chicago & Joliet Electric Railway, Joliet, Ill.**—Ground has been broken for a new two-story building to be erected on the site of the old building at the northwest corner of Ottawa and Clinton Streets, Joliet. It is expected that the new building will be ready for occupancy early in 1918. In the meantime the company has taken temporary office quarters in the Adams Arcade Building on Ottawa Street.

**Worcester (Mass.) Consolidated Street Railway.**—A contract has been awarded by the Worcester Consolidated Street Railway to J. P. Keeting of Westboro, for the construction of two trolley freight stations between Shrewsbury Street and Albany Street near Boulevard Park. The estimated cost is $75,000. One station will be used by the Boston & Worcester Street Railway and the other by the Worcester Consolidated Street Railway.

**Durham (N. C.) Traction Company.**—This company will construct a new carhouse on East Maine Street at a cost of about $7,500.

**Bartlesville (Okla.) Inter-Urban Railway.**—Work has been begun on the new Masonic building in Bartlesville, and when it is finished most of it will be occupied by Doherty companies. The Bartlesville Inter-Urban Railway will have one-half of the ground floor, and the Empire Gas & Fuel Company will occupy five floors. The Indian Territory Illuminating Oil Company, another Doherty company, will also have a floor.

**Sand Springs (Okla.) Railway.**—This company reports that it will build a new carhouse to replace the one recently destroyed by fire.

**Sudbury, Copper Cliff Suburban Electric Railway, Sudbury, Ont.**—This company has under construction at Sudbury a carhouse 50 ft. x 115 ft., and a station building 20 ft. x 30 ft.

**Canadian Northern Railway, Montreal, Que.**—This company is erecting new car shops in Port Mann.

**Newport News & Hampton Railway, Gas & Electric Company, Hampton, Va.**—It is reported that this company is considering the construction of a freight depot in Newport News.

## POWER HOUSES AND SUBSTATIONS

**Little Rock Railway & Electric Company, Little Rock, Ark.**—The Quartermaster's Department has awarded a contract to the Little Rock Railway & Electric Company to furnish electricity to the Twelfth Division cantonment near Little Rock.

**Fort Wayne & Northern Indiana Traction Company, Fort Wayne, Ind.**—It is reported that this company plans to construct an addition to its Spy Run power house at a cost of about $85,000.

**Iowa Railway & Light Company, Cedar Rapids, Iowa.**—A transmission line will be built by this company to State Center.

**Ottumwa Railway & Light Company, Ottumwa, Iowa.**—This company is improving its plant and will construct a new transmission line.

**Puget Sound Traction, Light & Power Company, Seattle, Wash.**—This company has been awarded a contract for all outside wiring for the permanent cantonment at American Lake, including furnishing electricity for lamps and motors.

# Manufactures and Markets

Discussions of Market and Trade Conditions for the Manufacturer, Salesman and Purchasing Agent

Rolling Stock Purchases Market Quotations Business Announcements

## Car Manufacturers Marking Time

### Present High Prices and Lack of Steel and Wood Responsible for Slow-Up in Building—Government Order for 100,000 Cars Pending

Railway car manufacturers are marking time but will await with interest the action of the government in regard to the purchase of rolling stock for the railways for emergency service. Early in June the co-operative Committee on Cars of the Advisory Commission, of which S. M. Vauclain is chairman, after much discussion proposed purchase by the government of 50,000 box cars and 100,000 gondola cars. This plan of the government to purchase rolling stock, which it is interesting to note originated with the committee on cars of the Advisory Commission and not with the railway car manufacturers, is now the all-absorbing topic in this field, and pending a decision or recommendation by the Council of National Defense, few orders are being placed for equipment.

### Car Plants Working at One-Third Capacity

At the present time car manufacturers have a reasonable amount of business in their establishments but have been unable to get steel and lumber in any quantity. The cars on order from steam and electric roads on June 1 amounted to approximately 100,000, of which 70,000 are for domestic use. With the car shops working at their normal capacity, this industry requires somewhat more than 200,000 tons of steel and approximately 40,000,000 ft. of lumber per month. On account of car shortage, embargoes, etc., only about one-third of the amount has been received at the shops, with the result that just at the period when the national life is suffering from a country-wide shortage of cars, the car manufacturers are working at only one-third of their normal capacity. One well-informed man in this industry is reported to have said: "If the government were to buy these 100,000 freight cars and turn them over to the railroads, the immediate use of this great number of cars in carrying raw materials for the steel industry would be sufficient to increase the output of steel necessary to supply all the needs of the car manufacturers without diminishing deliveries to other interests."

### Government Plan for Purchase of Cars

The plan for the purchase of cars by the government contemplates that they be leased to the railroad on a per diem basis until the close of the war, when they would be sold to the railroads at a reasonable price. The government is now in a position to buy the cars at lower prices than the railroad but can cover itself by this per diem charge, while the railroad would eventually receive the cars at a much lower figure than it would cost to build them under present conditions.

According to annual statistics published by the *Railway Age Gazette*, car shops in the United States and Canada have been operating at one-half their capacity for the last year or two. Only 135,000 freight cars were bought last year, according to this publication, as compared with more than 200,000 in 1913 and similar amounts in previous years. A careful study of the car situation in the last ten years shows that only on one or two occasions has the car surplusage reached as high as 12 or 14 per cent. In the last few years the surplusage, if any existed, did not amount to more than 2 to 4 per cent and in a number of cases an actual shortage existed. It is known that a car surplusage to the railroad is just as necessary as a surplus capital is to the banker or a surplus of raw materials to the manufacturer.

## Paint and Varnish Deliveries Good

### Railways Show Good Judgment by Buying the Best Grades of Paints and Enamels—Prices Increase Slightly—No Large Orders Reported

Although many companies are rebuilding or remodeling cars, and despite the fact that there have been some large car orders placed in the last few months, trade conditions in the paint, oil and varnish fields have been comparatively quiet. Unsettled business conditions due to war preparations have had their effect and are to a degree largely responsible for the present inactivities in this business. Many railway companies which expected to paint cars this summer according to schedule have deferred their work on account of the extremely high prices now prevalent.

This time last year linseed oil sold for eighty-two cents a gallon. This was considered a high price at that time, but this same product is now quoted at $1.14 a gallon. Zinc, white enamel, gums, fillers, etc., have all gone up considerably. In addition tin cans have increased greatly in price and are very difficult to obtain. Steel drums which formerly cost $6 now cost $10. Everything in connection with the paint industry has increased in cost, including even the labels which are pasted on the cans and boxes in which such cans are shipped.

### Railways Using Good Grades of Paints

Heretofore, some railways have been content to put on a cheap grade of paint or varnish and have found that it had been necessary to repaint the cars very often. Most railways are now using the best grade of paints, varnishes and enamels because they realize that it doesn't cost any more for labor to put on a good grade of paint than it does for a poor grade and that the principal cost is the labor cost. High-grade varnishes and paint are expensive, but are well worth the money invested. The old saying that you can't buy a gold dollar for 90 cents proves true in regard to these products as well as any others. Recently a well-known salesman approached a company executive in regard to a sale of a certain paint. After going over the matter thoroughly the salesman made the executive a price which was very low. The executive said that he could not afford to pay anywhere near that price as he had quotations from so-and-so that were more than 25 per cent cheaper. In fact, the price was cheaper by 15 per cent than the cost of linseed oil, one of the principal constituents. The nigger in the woodpile was discovered immediately when the paint was tested and was found to have been weakened.

### War Causes Shortage in Colors

There are some shades of paint which are not now obtainable on account of the war. Certain reds, yellows and greens which came from Germany cannot now be purchased, although greens and yellows have been made up in this country. The red, however, has not yet been duplicated, although it is known that certain manufacturers have been working along these lines. A good many railways are adopting a new system of varnishing and enameling for wooden or steel cars. This is called the quick painting system. Formerly it was necessary to shop a car for three or four weeks in order to paint it, but now the process can be completed in six to eight days by this new enameling system. In the case of a steel car, it must be sand blasted in order to remove every rust spot. The car is then given several coats of enamel and a finishing coat of varnish. The most expensive practice a man can follow is to use a poor paint on a canvas roof. Good results can be obtained by giving the canvas roof a first coating of a good canvas preserver to make it flexible, and then follow this by two coats of good roof paint.

Although the increases in the price of materials used in paints and varnishes have been very great, the prices have not been increased appreciably. As a whole, the paint and varnish men have been holding back waiting for the other fellow to boost prices, and as a result there has been very little increase in the price of these products. Deliveries are normal and for the most part orders can be filled directly out of stock.

## No Relief in Malleable Market

As an evidence of the tight condition of the market on malleable iron castings, a manufacturer in Philadelphia had to pay 12½ cents a pound for small malleables last week. In order to obtain fairly prompt deliveries even at this figure it was necessary to place the order with a New England foundry. Consumers of this line of product state that the production has not kept pace with the ordinary requirements of the trade. It does not take much of a rush of business such as is now being experienced therefore, to simply swamp the foundries. The only relief, manufacturers say, is to be found in the increase of the productive capacity of the foundries. This they claim is not only warranted but sorely needed. Foundries which have been built for making railway malleables, have in the lull in business of this class in recent years taken on other classes of work as for the automobile industry, building trades, etc. These lines now constitute the bulk of their output at the expense of railway work.

## New Construction Work in Philadelphia

Manufacturers of electric railway supplies and equipment are keeping an eye on the situation in Philadelphia. Indications point to an early settlement of the difficulties which have held up the completion and equipment of the Frankford Elevated line and the energetic construction of the rapid transit subways. Director of Transit W. S. Twining has prepared a form of lease whereby the Philadelphia Rapid Transit Company is to take over and operate the proposed city high-speed transit lines. This will be submitted to the Council on Aug. 17. Although the details of this lease have not been made public as yet it is reported by those in a position to know, that its terms are satisfactory to all parties concerned.

The Frankford elevated structure which is about two-thirds finished is to cost $7,400,000. This amount represents just the bare steel structure. Several million dollars will have to be spent for track and accessories, rolling stock and equipment. On the subway, contracts aggregating $14,000,000 have been awarded for construction work. The total cost of construction is estimated from $50,000,000 to $65,000,000. Only a small section is actually under construction, the amount of the contract covering it being about $3,000,000.

If the Philadelphia Rapid Transit Company takes over all of this work its activity in construction and equipment work will not be limited to these projects. A large amount of work in the way of surface line extensions will be put forward which has been held back pending the settlement of the controversy between the city and the company. The earnings of the Philadelphia Rapid Transit Company for the year just closed amounted to $2,000,000, which is double the earnings of the year previous. The bulk of this amount has been added to the company's sinking fund for extension work.

## Few Second-Hand Cars Available

A leading dealer in second-hand cars states that big double truck cars are "scarcer than hen's teeth." There is a big demand for this type of equipment from electric railways which will be called upon to serve the army cantonments and other government concentration and training camps. As a substitute, this dealer is selling single truck motors and trailers. An energetic search is also being made among the steam roads for day coaches to serve as trailers. Electric roads having orders placed for the popular "one-man" cars to supplant the big double truck cars are very fortunate for they will now find an active market for their old equipment.

## NEW YORK METAL MARKET PRICES

| | Aug. 3 | Aug. 10 |
|---|---|---|
| Prime Lake, cents per lb | 29 | 28 |
| Electrolytic, cents per lb | 29 | 28 |
| Copper wire base, cents per lb | 36 | 36 |
| Lead, cents per lb | 10⅞ | 10⅞ |
| Nickel, cents per lb | 50 | 50 |
| Spelter, cents per lb | 8¾ | 8¾ |
| Tin, Straits, cents per lb | 63¾ | 63⅝ |
| Aluminum, 98 to 99 per cent, cents per lb | 56 | 56 |

## OLD METAL PRICES

| | Aug. 3 | Aug. 10 |
|---|---|---|
| Heavy copper, cents per lb | 23½ | 24½ |
| Light copper, cents per lb | 20½ | 21½ |
| Red brass, cents per lb | 19 | 19½ |
| Yellow brass, cents per lb | 15½ | 16 |
| Lead, heavy, cents per lb | 8½ | 8½ |
| Zinc, cents per lb | 6 | 6 |
| Steel car axles, Chicago, per net ton | $45.00 | $41.00 |
| Old car wheels, Chicago, per gross ton | $31.50 | $31.50 |
| Steel rails (scrap), Chicago, per gross ton | $43.00 | $40.00 |
| Steel rails (relaying), Chicago, per gross ton | $60.00 | $55.00 |
| Machine shop turnings, Chicago, per net ton | $16.50 | $16.50 |

## CURRENT PRICES FOR MATERIALS

| | Aug. 3 | Aug. 10 |
|---|---|---|
| Rubber-covered wire base, New York, cents per lb. | 36½ | 36½ |
| No. 0000 feeder cable (bare), New York, cents per lb. | 36½ | 36½ |
| No. 0000 feeder cable (stranded), New York, cents per lb. | 33¾ | 33¾ |
| No. 6 copper wire (insulated), New York, cents per lb. | 33 | 33 |
| No. 6 copper wire (bare), New York, cents per lb. | 36 | 36 |
| Rails, heavy, Bessemer, Pittsburgh | $38.00 | $38.00 |
| Rails, heavy, O. H., Pittsburgh, per gross ton | $40.00 | $40.00 |
| Wire nails, Pittsburgh, per 100 lb | $4.00 | $4.00 |
| Railroad spikes, 9/16 in., Pittsburgh, per 100 lb | $7.00 | $7.00 |
| Steel bars, Pittsburgh, per 100 lb | $4.50 | $4.50 |
| Sheet iron, black (24 gage), Pittsburgh, per 100 lb. | $8.35 | $8.35 |
| Sheet iron, galvanized (24 gage), Pittsburgh, per 100 lb. | $9.55 | $9.55 |
| Galvanized barbed wire, Pittsburgh, cents per lb. | $4.85 | $4.85 |
| Galvanized wire, ordinary, Pittsburgh, cents per lb. | $4.65 | $4.65 |
| Cement (carload lots), New York, per bbl | $2.22 | $2.22 |
| Cement (carload lots), Chicago, per bbl | $2.31 | $2.31 |
| Cement (carload lots), Seattle, per bbl | $2.60 | $2.65 |
| Linseed oil (raw, 5 bbl. lots), New York, per gal. | $1.13 | $1.18 |
| Linseed oil (boiled, 5 bbl. lots), New York, per gal. | $1.14 | $1.19 |
| White lead (110 lb. keg), New York, cents per lb. | 12¾ | 12¾ |
| Turpentine (bbl. lots), New York, cents per gal. | 42½ | 42½ |

## ROLLING STOCK

**Northern Ohio Traction & Light Company, Akron, Ohio,** has purchased four Baldwin 87-40 AA trucks to be used on heavy interurban cars in cantonment service.

**Cienfuegos, Palmira & Cruces Railway & Power Company, Cienfuegos, Cuba,** is in the market for ten storage battery cars. The executive offices of this company are at 80 Maiden Lane, New York City.

**Inter Urban Railway, Des Moines, Iowa,** has ordered one electric locomotive from the Westinghouse Electrical Manufacturing Company to be used in handling traffic to the cantonment near Des Moines.

**Bay State Street Railway, Boston, Mass.,** is reported to be considering the use of one-man cars on twelve of its routes and has petitioned the Public Service Commission for permission to operate this type of car.

**Fort Wayne & Northern Indiana Traction Company, Fort Wayne, Ind.,** has specified the following details for two box cars which are being built by the St. Louis Car Company:

| | | | |
|---|---|---|---|
| Number | 2 | Control, type | West. H-L. |
| Date of order | April, 1917 | Couplers | Tomlison No. 12 |
| Date of delivery | August, 1917 | Fenders | Locomotive steel pilot |
| Builder | St. Louis Car | Gears | Tool Steel Gear and Pinion |
| Type | Box | Hand brakes | Peacock Nostaff |
| Weight (total) | 64,000 lb. | Headlights | Luminous Arc |
| Bolster centers | 33 ft. 0 in. | Journal boxes | Symington |
| Over bumpers | 55 ft. 0 in. | Lightning arresters | West. |
| Over vestibule | 53 ft. 0 in. | Motors | West. No. 85, inside hung |
| Width over all | 8 ft. 6 in. | Paint | Builder's Standard |
| Rail to trolley base | 13 ft. 0 in. | Sanders | Knight, pneumatic |
| Body | Wood | Springs | Crucible steel |
| Roof | Arch | Trolley retrievers | No. 2 Knutson |
| Air brakes | West. D.2E.G. | Trolley base | U. S. No. 14 |
| Axles | Carnegie steel | Trolley wheels | Moore-Jones |
| Bumpers | Channel | Trucks | Baldwin, 78-in. wheelbase |
| Conduits | Crouse-Hinds | Wheels | 37-in. roll. steel |

**Northwestern Pennsylvania Railway, Meadville, Pa.**, has specified the following details for five three-compartment double-end passenger cars, being built by the Wason Manufacturing Company.

| | |
|---|---|
| Number of cars ordered | 5 |
| Date of order | June |
| Date of delivery | October |
| Builder | Wason |
| Type | Three compartment |
| Seating capacity | 46 |
| Weight (total) | 53,000 lb. |
| Over bumpers | 47 ft. 3½ in. |
| Over vestibule | 45 ft. 11½ in. |
| Width over all | 8 ft. 6¾ in. |
| Rail to trolley base | 12 ft. 6 in. |
| Body | Semi-steel |
| Interior trim | Mahogany |
| Headlining | Agasote |
| Roof | Arch |
| Air brakes | Westinghouse |
| Axles | Standard Car Works |
| Bumpers | Rico anti-climber |
| Car trimmings | Wason |
| Conduits and junction boxes, | Wason |
| Control, type | H-L |
| Couplers | Tomlinson |
| Curtain fixtures | Forsyth |
| Curtain material | Pantasote |
| Designation signs | Northwestern |
| Door mechanism | None |
| Fare boxes | None |
| Fenders | Pilots-Wason |
| Gears and pinions | Nuttall |
| Hand brakes, | Pittsburgh drop handle |
| Heaters | Peter Smith |
| Headlights | None |
| Journal boxes | Symington |
| Lightning arresters, | Westinghouse |
| Motors | Four Westinghouse 306, inside hung |
| Registers | None |
| Sanders | Nichols-Lintern |
| Sash fixtures | Edwards |
| Seats | Brill |
| Seating material, | Plush and leather |
| Step treads | Mason |
| Trolley catchers | Keystone |
| Trolley base | Westinghouse |
| Trolley wheels, | Erie Trolley Wheel Co. |
| Trucks | Baldwin |
| Ventilators | Not yet specified |
| Wheels | Davis |

## TRADE NOTES

**Die Casting Company, Irvington, N. J.**, has taken over the business of the Irvington Die & Tool Works.

**Edgar N. Dollin**, organizer and president of the Acme-Die-Casting Company, has sold his holdings in the company and is retiring from active management.

**H. H. Cudmore** has left the Mazda lamp department of the General Electric Company to join the Argus Lamp & Appliance Company of Cleveland, Ohio.

**R. W. Shauman** has been made president of the Universal Concrete Products Company, manufacturer of the centrifugal process concrete pole, to succeed J. R. Blackhall, resigned.

**National Pneumatic Company, New York, N. Y.**, has greatly enlarged its offices at 50 Church Street by taking over the adjoining offices formerly occupied by the Electric Service Supplies Company.

**Electric Service Supplies Company, Philadelphia, Pa.**, announces that its New York office is located temporarily at 30 Church Street, but that on May 1, 1918, will return to larger quarters at 50 Church Street.

**Sullivan Machinery Company, Chicago, Ill.**, announces the removal of its San Francisco office from the Sheldon Building at 461 Market Street to the Hobart Building, 582 Market Street. Ray P. McGrath is manager at San Francisco.

**L. A. Starrett**, who has been connected with the Westinghouse Electric & Manufacturing Company for a number of years, has resigned his position with that company and will hereafter cover Ohio and Michigan territory for the Ironton Engine Company.

**Holden & White, Inc., Chicago, Ill.**, general sales agents for the Anderson Brake Adjuster Company, have received an order from the Tri-City Railways, Davenport, Iowa, for 270 of these brake adjusters. This order covers two adjusters per car for 135 cars, and is placed for early delivery.

**Safety Car Devices Company, St. Louis, Mo.**, announces that it has received orders for two sets of safety car equipments from the Pacific Power & Light Company, one set from the Boston Elevated and a considerable number of sets of equipments of which the ultimate orders are not as yet known.

**Unit Ventilation Company, Queens, N. Y.**, has been incorporated to manufacture ventilating devices and to do a general electrical and mechanical engineering business. The incorporators are: A. Bautz of College Point; W. F. Brown, 911 Whitlock Avenue, the Bronx, and J. F. Maguire, 375 Fulton Street, Brooklyn, N. Y.

**Edward R. Mason**, assistant general sales agent of the Ohio Brass Company, has resigned to accept a commission as lieutenant commander in the National Naval Volunteers and has taken up his new duties in the United States Navy. The commission which Mr. Mason holds in the navy is equivalent in rank to a major in the United States Army.

## NEW ADVERTISING LITERATURE

**Farnsworth Company, Conshohocken, Pa.**: A book on its Farnsworth tilting steam traps.

**New York Brass Foundry Company, New York, N. Y.**: A booklet on the Monitor detector system.

**D. R. Sperry & Company, Batavia, Ill.**, has issued an attractive catalog on the Sperry filter press.

**Mitchell-Rand Manufacturing Company, New York, N. Y.**: A mailing card containing a few plain tape samples.

**Edison Storage Battery Company, Orange, N. J.**: Bulletin 606 on Edison batteries for use in storage-battery locomotives.

**National X-Ray Reflector Company, Chicago, Ill.**: Leaflet "It's Never Too Late," emphasizing the use of this company's products.

**V. V. Fittings Company, Philadelphia, Pa.**: A forty page catalog on new types of V. V. fittings, safety devices and vapor-proof fittings.

**Barrett Company, New York, N. Y.**: Booklet on "How a Tarvia Macadam Roadway Is Constructed"; also a booklet, "Tarvia B," on road preservation.

**Crocker-Wheeler Company, Ampere, N. J.**: Bulletin No. 179 descriptive of its alternating-current oil switch for reversing service for two-phase or three-phase work.

**Whiting Foundry Equipment, Harvey, Ill.**: Catalog No. 130 descriptive of Whiting cranes. A number of special cranes for railway and transfer service are shown and described.

**American Chain Company, Inc., Bridgeport, Conn.**: A pamphlet devoted to the Campbell hammer-lock self-spreading cotter pin. Describes method of inserting, locking and removing pins, also gives price lists of all sizes made with the different sizes of packages with weights of 1000 pins.

**Viele, Blackwell & Buck, New York City, N. Y.**: A bulletin descriptive of the engineering and construction work which this firm has carried on. Photographs are shown of various plants in the United States, Canada and Mexico. The bulletin is well prepared and handsomely illustrated.

**Stanley Building Corporation, Chicago, Ill.**: A pamphlet on this company's special line of solid woven cotton belting impregnated with a special compound. The advantages claimed for this belting, the economy gained by its use, tables giving horsepower transmitted for various speeds and price lists of various sizes are included.

**Western Block Company, Lockport, N. Y.**: A pamphlet on this company's line of blocks for use with Manila and wire rope. Catalog includes description and illustration of blocks that can be supplied out of stock. Table of prices and sizes along with description of various iron and steel special blocks, bearings, bushings, small eyehooks, etc., are given.

**Solvay Process Company, Syracuse, N. Y.**: A blue book entitled "Solvay Alkali" which deals with the various forms and uses of alkali and contains notes on alkalimetry and various chemical and commercial tables useful for the consumer. This edition has been published as the direct result of the popularity of the preceding edition as a ready reference book on these products.

**Shepard Electric Crane & Hoist Company, Montour, N. Y.**: A 116-page bulletin on hoisting machinery for industrial work. This pamphlet is intended to present in clear and exact form such data as will enable engineers and managers to consider applications of hoisting and conveying units to the various uses for which they are adapted. Various types of hoists and cranes are described and illustrated.

## NEW PUBLICATION

**Congress of Human Engineering.** Bulletin No. 16 of the College of Engineering of the Ohio State University, Columbus, Ohio. 160 pages. Paper.

This interesting little volume contains the text of addresses on the human side of engineering and business delivered at a congress held last October. It will appeal to all employers of men who regard them as more than mere machines.

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was one of Shakespeare's most likable characters whose words, though lightly spoken, carried sharp truths.

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Perhaps to some men the five or ten feet difference between the stop with a Peacock brake and one with some of the next best brakes, may seem small—

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Shrewdly planned lateral and transverse expansion-joints at the proper intervals and angles may serve to prevent the expansion of the pavement from thrusting the curbing out of line, or from causing trouble at manholes, railway tracks, etc. The placing of such expansion-joints, however, is far from an exact science; moreover, the joints themselves are sources of trouble, for they must necessarily be wide inasmuch as they must account for the expansion of a considerable area of bricks.

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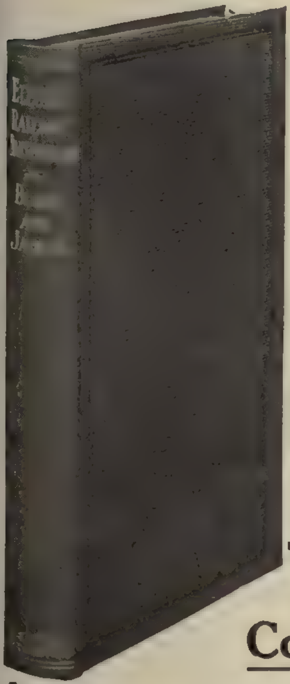

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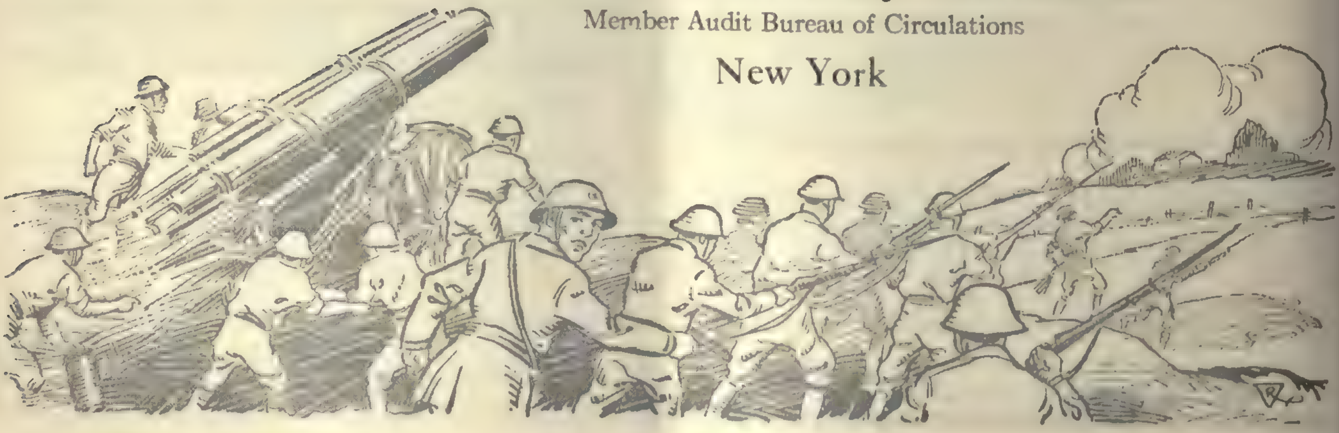

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- Banding and heading machines
- Car hoists
- Car replacers
- Coil taping machines for armature leads
- Coil winding machines
- Pinion pullers
- Pit jacks
- Signal or target switches
- Tension stands

### CAR EQUIPMENT

- Armature and Axle Bearings
- Armature and field coils
- Bearings (Axle and Armature)
- Brush-holders and brush-holder springs
- Brake, door and other handles
- Brake forgings, riggings, etc.
- Car trimmings
- Commutators
- Controller handles
- Forgings of all kinds
- Gear cases (steel or mall. iron)
- Grid resistors
- Third-rail shoe beams and accessories
- Trolley poles (steel) and wheels

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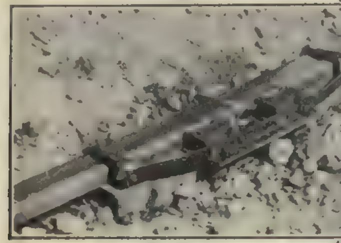
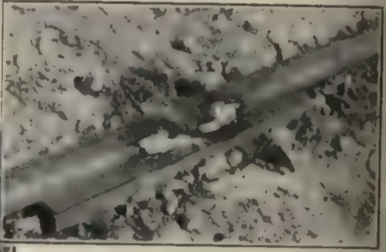


Mold in Place for Arc-Welded Bond



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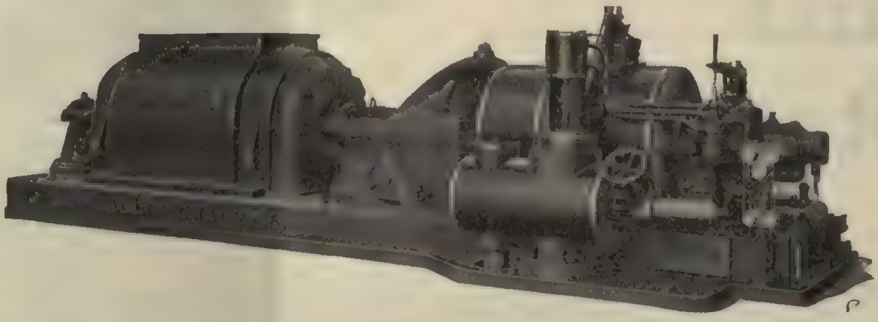

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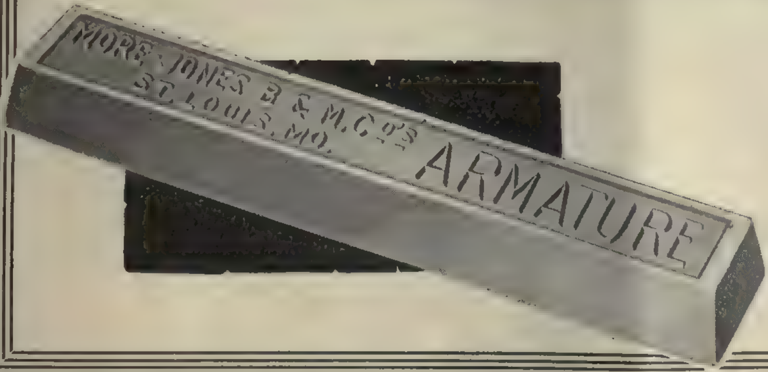

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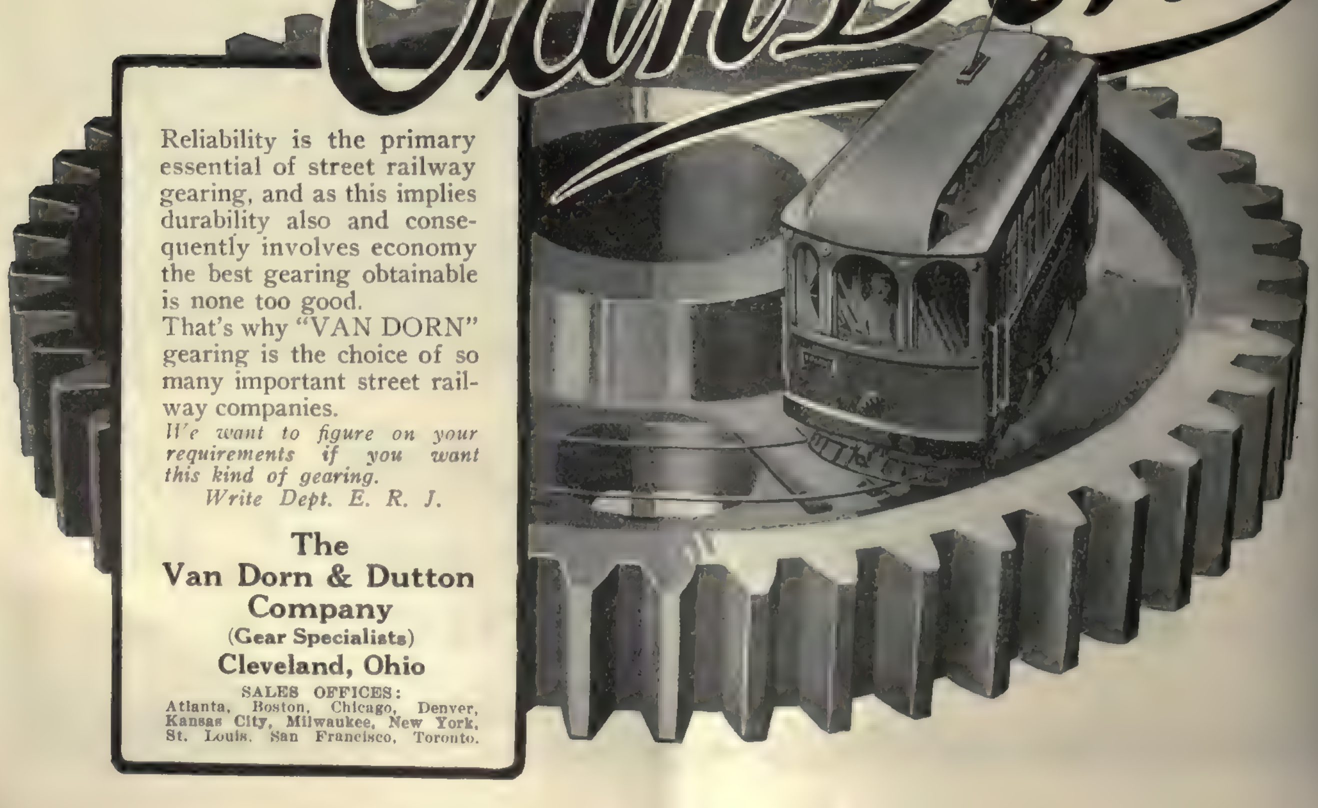

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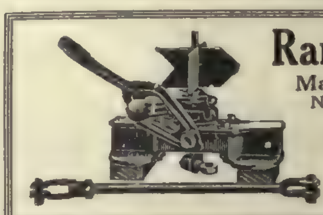

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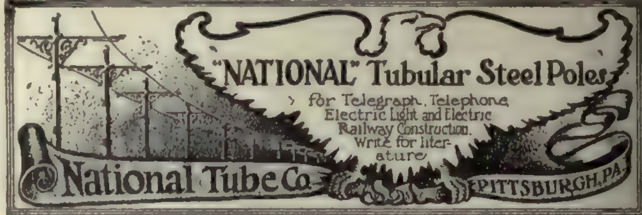
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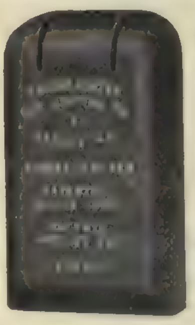

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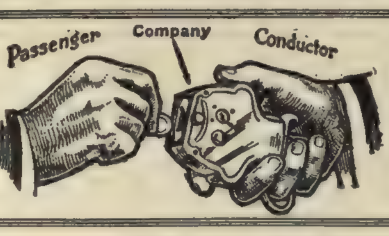

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*Manufacturers of* The Providence Fender and H-B Life Guard

**Wendell & MacDuffie Co., 61 Broadway, New York**
General Sales Agents

**KINNEAR Steel Rolling Doors**

**FOR CAR HOUSES**

Compact, Durable, Easily and Speedily Operated and Fireproof. Openings of any size may be equipped and the doors motor-operated if desired. Manufactured by the

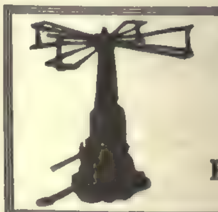
KINNEAR MANUFACTURING CO., Columbus, Ohio
BOSTON PHILADELPHIA CHICAGO

**RAILWAY UTILITY COMPANY**

*Sole Manufacturers*

**"HONEYCOMB" AND "ROUND JET" VENTILATORS**
for Monitor and Arch Roof Cars, and all classes of buildings; also
**ELECTRIC THERMOMETER CONTROL**
of Car Temperatures.

141-151 WEST 22D ST. Chicago, Ill.
*Write for Catalogue*
1328 BROADWAY New York, N. Y.



Use them in your terminals—
**PEREY TURNSTILES**
**or PASSIMETERS**

*Faster than the ticket seller*

**Perey Manufacturing Co., Inc.**
30 Church Street, New York City

There are literally hundreds of firms who use Genuine or similar babbitts, that could use BULL BABBITT and more than cut their babbitt bill in half. The only reason they do not use it is because they do not know that BULL BABBITT actually outwears Genuine, that it possesses high anti-frictional qualities, that it is adaptable to nearly all general uses, and yet costs less than the other.

THE AJAX METAL COMPANY
Main Office and Works Established 1880 Southern Plant
Philadelphia, Pa. Birmingham, Ala.
OFFICES: New York Boston Pittsburgh Washington
Chicago St. Louis San Francisco Detroit

**Holden & White Inc.**

**Electric Railway Sales Distributors for:**

Wasson Air-Retrieving Trolley Bases. (U. S.)
Garland Ventilators.
Perry-Hartman Self-Centering Center Plates and Anti-Friction Side Bearings.
Watson Car Lighting Regulator.
Anderson Brake Slack Adjusters.

**Chicago District Representatives for:**

Drew Line Material.
Columbia Car & Shop Equipment.
Miller Trolley Shoe.
Lincoln Rail Bonding and Bonds.

**1508 Fisher Building CHICAGO**

TROLLEY POLES

Our stock of over 7000 high carbon steel poles is at all times available for immediate shipment.

These poles are of high grade special skelp, properly reinforced, and will sustain a wheel pressure of from 35 to 40 pounds without taking a permanent bend.

The increasing price of steel makes it to your interest to buy from stock.

NUTTALL
PITTSBURGH

INSURANCE AGAINST SNOW BLOCKADES

A blockade means loss of revenue. You can avoid this loss by having your cars equipped with ROOT SPRING SCRAPERS. They begin working when the snow begins falling and make it possible to maintain your schedule even during heavy snow storms. Scraper No. 6 (shown below) is especially well adapted to handle a heavy snow fall. It is replacing sweepers on many lines.

*Send to-day for our Catalog*

ROOT
Spring
Scraper

Root
Spring
Scraper
Company,
Kalamazoo,
Michigan

The "Hycap-Exide" Battery
for
STORAGE BATTERY STREET CARS
THE ELECTRIC STORAGE BATTERY CO
PHILADELPHIA

When writing to Advertisers in this publication you will confer a favor on both publisher and advertiser by mentioning the Electric Railway Journal

S-W Shim Slack Adjusters Save Brakeshoes and Labor

SMITH-WARD BRAKE COMPANY, Inc.
17 Battery Place, New York

"GLOBE" VENTILATORS

An Efficient, Leakproof Ventilator at a reasonable price
Globe Ventilator Co., Troy, N.Y.

# Service

You get more than simply BRAKE SHOES when you use our Product.

You get the advantage of our constant effort to improve our product for your service.

You get the earnest co-operation of our engineers to assist you in getting the full quota of service from each Brake Shoe applied.

Miles of service from the Brake Shoe are more to be desired than pounds of scrap.

All of which means increased efficiency and decreased cost of Brake Maintenance.

**American Brake Shoe & Foundry Co.**
**30 Church St., New York**
**McCormick Bldg., Chicago Chattanooga, Tenn.**

**Steel for Service**

Why be bothered any more than necessary with gear troubles.

Gears cut from

**Carnegie Rolled Steel Gear Blanks**

reduce such troubles to a minimum and thereby eliminate an endless amount of annoyance and useless expense.

**Carnegie Steel Company**
General Offices, Pittsburgh, Pa.

902

## The Baldwin Locomotive Works

**Philadelphia, Pa.**

## ELECTRIC MOTOR and TRAILER TRUCKS

Merely to furnish "Good" brushes is not our idea of service to render our customers; for all grades of AMERICAN Brushes are good—each for a particular range of service.

**AMERICAN CARBON & BATTERY WORKS E. ST. LOUIS, ILL.**
OF NATIONAL CARBON CO., INC.

**"Boyerized" Products Reduce Maintenance**

Bemis Trucks
Case Hardened Brake Pins.
Case Hardened Bushings
Case Hardened Nuts and Bolts
Manganese Brake Heads
Manganese Transom Plates
Manganese Body Bushings
Bronze Axle Bearings

Bemis Pins are absolutely smooth and true in diameter. We carry 40 different sizes of case hardened pins in stock. Samples furnished. Write for full data.

**Bemis Car Truck Co., Springfield, Mass.**

## VAN DORN COUPLERS

are made for every condition and requirement. M. C. B. Pin and Link, Car and Air, in all sizes and types.

**VAN DORN COUPLER CO.**
**2325 So. Pauling St., Chicago, Ill.**

**UNION SPRING & MFG. CO.**
**SPRINGS**
COIL AND ELLIPTIC
**M. C. B. Pressed Steel Journal Box Lids**
General Office: First Nat'l Bank Bldg.
PITTSBURGH, PA.
Works: New Kensington, Pa.
50 Church St., New York. 1204 Fisher Bldg., Chicago, Ill.
Missouri Trust Bldg., St. Louis, Mo.

"Trade Mark Reg. U. S. Pat. Off."

**Samson Spot Waterproofed Trolley Cord**

Made of fine cotton yarn braided hard and smooth. Inspected and guaranteed free from flaws. Proved to be the most durable and economical. Samples and information gladly sent.

1 **SAMSON CORDAGE WORKS, BOSTON, MASS.**

# SEARCHLIGHT SECTION

## MISCELLANEOUS WANTS

### Wanted at Once

For immediate shipment any quantity of battery lead plates, sediment scrap copper and wire, brass and all other grades of scrap material. Write to us today for our prices. National Metal & Rubber Co., 31 India Wharf, Boston, Mass.

## POSITIONS WANTED

AUDITOR, secretary or treasurer of interurban road; 15 years' experience; fully acquainted interstate commerce commission requirements; furnish excellent references and bond as required. (Ind.) PW1574, Elec. Ry. Journal, Chicago.

COPPER zone fare collection. I have successfully handled this system for three years, and can do the same for you. Get a specialist and anticipate your needs. (Conn.) PW1565, Elec. Ry. Journal, N. Y. C.

ENGINEER ways and structures. Practical man, 10 years' experience on up-to-date roads with modern construction. Has engineering training. Has charge track, overhead, high tension work, etc. Best references. Married, age 30. (W. Va.) PW1595, Elec. Ry. Journal, Cleveland.

PURCHASING agent of seventeen years' experience, now employed, desires position with large property; thoroughly competent. Familiar with organizing and conducting storeroom. Can give A1 references from present and past employers as to character and ability. (Ala.) PW1585, Elec. Ry. Journal, Philadelphia.

OPERATING executive, age 44, with 22 years' experience, open for engagement. Have thorough understanding of effective organization and progressive, practical working methods that have brought the largest results to street and interurban railway companies, and to meet rapid changing conditions successfully. Good reasons for wanting change. Best of references. (Miss.) PW1599, Elec. Ry. Journal, Chicago.

### Your Advancement

is largely in your own hands—it is doubtful if anyone else is worrying over it

Better positions are constantly being secured through small advertisements in the "Positions Wanted" Columns

60 cents for 20 words

### ADVERTISEMENTS ARE KEYED

to our office nearest the advertiser. The advertiser's location is indicated by the state abbreviation preceding the box number.

### IN REPLYING

be careful to put on envelope the key number in the ad. and also local address of office to which reply is sent.

239 West 39th St., New York.
1570 Old Colony Bldg., Chicago.
657 Leader-News Bldg., Cleveland.
935 Real Estate Trust Bldg., Phila.
501 Rialto Bldg., San Francisco.

### IMPORTANT

Original letters of recommendation or other papers of value should not be enclosed to unknown correspondents—send copies.

## POSITIONS WANTED

SECRET service man, capable of undertaking all kinds of secret work. Fully acquainted with the labor situation, as applied to electric railways, power companies, etc., wishes to make connection with reliable corporation as head of their secret service. At present employed by a large corporation, doing all of their work, and giving satisfaction. Have been with this company over three years. Reason for changing, present position is too much of a snap. Want a job where I can be active and acquire the extensive experience which only comes with hard work, 30 years of age, married, do not drink, discharged from "draft" and have 8 years' secret service experience. Communicate in confidence with (Mich.) PW1600, Elec. Ry. Journal, Chicago.

SUPERINTENDENT — Electric railway construction or operating. 15 years' experience as superintendent of construction, 5 years superintendent of operation. High class references furnished. B. J. Schram, 2354 Upton St., Chicago, Ill.

## POSITIONS VACANT

ARMATURE winders. Permanent positions. Best working conditions. Address (Ind.) P1580, Elec. Ry. Journal, Cleveland.

NIGHT barn foreman who is good all-round car repairman, one who understands brakes and has sufficient electrical experience to make minor repairs on multiple unit control. Western road. (Wash.) P1597, Elec. Ry. Journal, Chicago.

### An Opportunity

Wanted by Electric Railway in New York City

### Technical Graduate

to do office electrical engineering work, especially calculations.

(N. Y.) P1594, Elec. Ry. Journal, N. Y. C.

## POSITIONS VACANT

QUALIFIED consulting engineers wanted to submit record of training and experience and join the A. A. E. to complete the list for "Service to the Public" bureau. American Associaton of Engineers, National Co-operative Business Organization, 29 So. LaSalle St., Chicago, Ill.

PIT foreman who understands brakes, trucks and motors for road on West Coast. Preferably man who is all-round electrician and can repair and maintain Westinghouse A. B. control. Good opportunity for the right man. Must give references and state salary expected. (Wash.) P1596, Elec. Ry. Journal, Chicago.

WANTED—Man over 30, qualified in general office railway accounting. State age, experience and salary expected. (Ind.) P1598, Elec. Ry. Journal, Chicago.

## EMPLOYMENT AGENCIES

### Correspondence Service

The undersigned provides a confidential service designed to locate openings through correspondence for men earning not less than $2,500 and up to $25,000; all lines. Not an employment agency, but a constructive, initiative service, covering individual negotiations. Established 1910. Complete privacy assured; present connections in no way jeopardized. Send name and address only for explanatory details. R. W. Bixby, H1 Niagara Square, Buffalo, N. Y.

## FOR SALE

### 85 lb. A. S. C. E. Relayers

16,000 tons—with Angle Bars to match. Available immediate shipment and centrally located.
We positively own these Rails and offer same in carload lots and over.
25,000 tons—Relayers—sizes 25 lb. to 100 lb., in stock our Pittsburgh yards and vicinity.
Immediate shipment guaranteed and prices very attractive.
Carload and less than carload inquiries and orders solicited.
Rails cut to length for structural purposes.
Frogs, Switches, Bolts, Nuts, Spikes and all Accessories.

L. B. FOSTER COMPANY
Park Bldg. Pittsburgh, Pa.

### Immediate Shipment

1 500 KW., 550 V. D. C., 320 RPM., Westinghouse Type "M" compound wound generator.

DUQUESNE Electric & Mfg Co.

Bessemer Bldg. Pittsburgh, Pa.

# SEARCHLIGHT SECTION

## FOR SALE

### MOTORS

4—W. H. 38-B **Motors**, complete with gears, pinions and gear casings.

12—W. H. 68 **Motors**, complete with gears, pinions and gear casings.

8—G. E. 80 **Motors**, complete with gears, pinions and gear casings.

10—G. E. 67 **Motors**, complete with gears, pinions and gear casings.

12—G. E. 73 **Motors**, complete with gears, pinions and gear casings.

### CONTROLLERS

12—W. H. K-6 Controllers. 20—K-11 Controllers.
30—K-10 Controllers. 10—K-28-B Controllers.

### COMPRESSORS

25—AA-1 Air Compressors.

### GEARS

51—Solid Gears, 68 teeth, 3⅞" rough bore, machined from Carnegie rolled steel blanks, standard hub, for W. H. 12-A, 68, 56 and 49 Motors. Can be bored for 4½" axle.

### LATHE

1—Pond Car Wheel Lathe, motor driven.

**For further particulars apply to**

**W. R. KERSCHNER COMPANY, INC.**
**50 Church Street, New York, N. Y.**

---

## IMMEDIATE SHIPMENT

1—500 KW. General Electric Curtis steam turbine, 3 ph., 60 cy., 1800 rpm., 2300 volts, 150 lb. steam pressure, vertical type.

1—500 K.W. Westinghouse Horizontal Turbo Generating Unit wound for 3 phase, 60 cycle, 2300 volts, speed 3600 rpm., condensing duty.

### 25 Cycle Rotary Converters

2—150 KW. General Electric type T.C., 4-150-750, 25 cycle, 3 ph., 575 volt, rotary converters, 750 rpm., complete with end play and speed limit device.

### 200 Kilowatt 60 Cycle Rotary Converters

1—200 KW. Westinghouse 3 ph., 60 cy. rotary converters, 550 volts, 720 rpm., complete with 4—100 KW. Westinghouse Scott connected oil insulated transformers, 10,000/9500 volts prim., 430/362 volts secy.

1—150 KW. Westinghouse 3 ph., 60 cy., rotary converter, 550 volts, 720 rpm.

### Transformers

3—750 KVA. General Electric oil filled self cooled transformers, 4400/281 volts, with 4400-4290-4180-4070-2200-2090-1980 taps in the primary.

3—500 KW. General Electric, 60 cy., single phase transformers, 66,000 volts primary, 4400/2200 volts secondary.

3—375 KVA. Allis Chalmers O. I. S. C. indoor type transformers, 25 cy., 2300 v., 367 v. secy.

3—350 KVA. General Electric, type H, 60 cy., transformers 2400/2300/2200 v. prim., 200/400 v. secy.

1—100 KVA. General Electric, type H, 60 cy. transformer, 4600 volts prim., 115-230 volts secy.

4—100 KW. Westinghouse, oil insulated, Scott connected transformers, 10,000/9500 v. prim., 430/362 v. secy.

3—75 KW. Westinghouse 60 cy. transformers, 2200 v. prim., 110/220/440 v. secy.

3—50 KVA. General Electric type H, 60 cy. transformers, 900/1000/16000 v. prim. Y., 230/460 v. secy.

Also a stock of smaller sized transformers.

IMMEDIATE DELIVERY

**ARCHER & BALDWIN, Inc.**
**114-118 Liberty Street New York City**
TELEPHONE 4337-4338 RECTOR

---

## THREE

1500 KVA. 25 Cycle

Single Phase

## WESTINGHOUSE TRANSFORMERS

Oil Insulated Water Cooled

33,000/2,300 Volts

**MACGOVERN & COMPANY**
**INC.**
**114 Liberty Street New York, N. Y.**

---

FOR SALE

## New 300 K.W. Rotary

Complete G.E. Rotary, 1200 R.P.M., 600 V., 3 Ph., 60 Cyc., Field Winding C.W. 150% 2 Hour Overload. Weight 13,000 Lbs. Type TC. Six Poles. 500 Amperes, includes Transformers, Switchboard, etc., all complete for substation.

Transformers, Type HR, 100 KVA, 60 Cyc. Primary Volts 15000/26000Y, Secondary Volts 370. Amps. at Full Voltage 270 each. Trans. designed for Y connection on 26,000 V. cir. Taps provided for additional approximate voltages—Primary 14400/13800/13200/1300. Secondary 50% starting. Oil cooled. Net weights Trans. 4800 Lbs. Oil 1150. Height over leads 90 in. Floor space 46 x 81 ins. 15% Inherent Reactance. This substation now installed and will be demonstrated on actual working load for customer. Immediate delivery. Cash. Price complete $5,500.

## West. Interurban For Sale

52 Ft. 3 Compart. Interurban Car. 306 Motors. HL Control in fine shape. Brand new Pinions and Motor Bearings throughout All overhauled. Can be demonstrated in service at place of delivery. Do not miss this car offering when cars are scarce. (Ind.)

F81588, Elec. Ry. Journal.

---

## Josh Billings said:

> "I luv the rooster for 2 things. For the crow that iz in him and for the spurs he has got to bak up the crow with."

All the arguments in the world wouldn't persuade so many people to use the "Want" and "For Sale" pages of Electric Railway Journal unless the paper showed results with which to back up the arguments.

**Look at the Searchlight advertisements in this issue**

# SEARCHLIGHT SECTION

## SYNCHRONOUS SET WITH SWITCHBOARD AND EXCITER

**Immediate Shipment—Absolutely New. 3 Bearings with common Bedplate. Will start from either end. 300 R.P.M. open type. Made by Electrical Machinery Co.**

25 Cy. End—1—1150 H.P. output 895 K.V.A. Input 3 ph., 25 cy., 2200 V., 300 R.P.M. Two Bearing Self Starting Synchronous Motor 35% Starting torque with 125% K.V.A. Will reconnect for 550 V. and operate as Generator at either Voltage.

60 Cy. End—1—1450 H.P. Output,, 1125 K.V.A. Input, 3 ph., 60 cy., 2200 V., 300 R.P.M. (*Two Bearing*) Self Starting Synchronous Motor 35% Starting Torque with 125 K.V.A. Will reconnect for either 440 V. or 550 V. and operate as generator at any of these Voltages.

**SHAFT**—Has projection on one end for coupling to pump or other apparatus.

**COMPENSATOR**—1000 H.P., 25 cy., 2200 V. Suitable to start the 60 cy. motor also.

**SW.-BRD.**—2 Panels suitable for starting and running either end and operating the other end at the same time as a generator.

**EXCITER SET**—Direct connected on common bedplate.

**MOTOR**—3 ph., 60 cy., 2200 V., 1200 R.P.M.

**GENERATOR**—20 K.W., 125 V., D.C. Compound.

**DRAWINGS**—Through the courtesy of the Mfrs. we can supply copies of Performance Guarantees, Blueprints and Specifications.

**LOCATION**—Now stored at Central Warehouse Co., St. Paul, Minn.

**SPECIAL ADAPTABILITY**—For supplying 60 cy. Low P.F. induction motor installation from a 25 cy. source, or for driving large apparatus from TWO sources of supply and at the same time operating auxiliary apparatus, induction motors and lights in the plant.

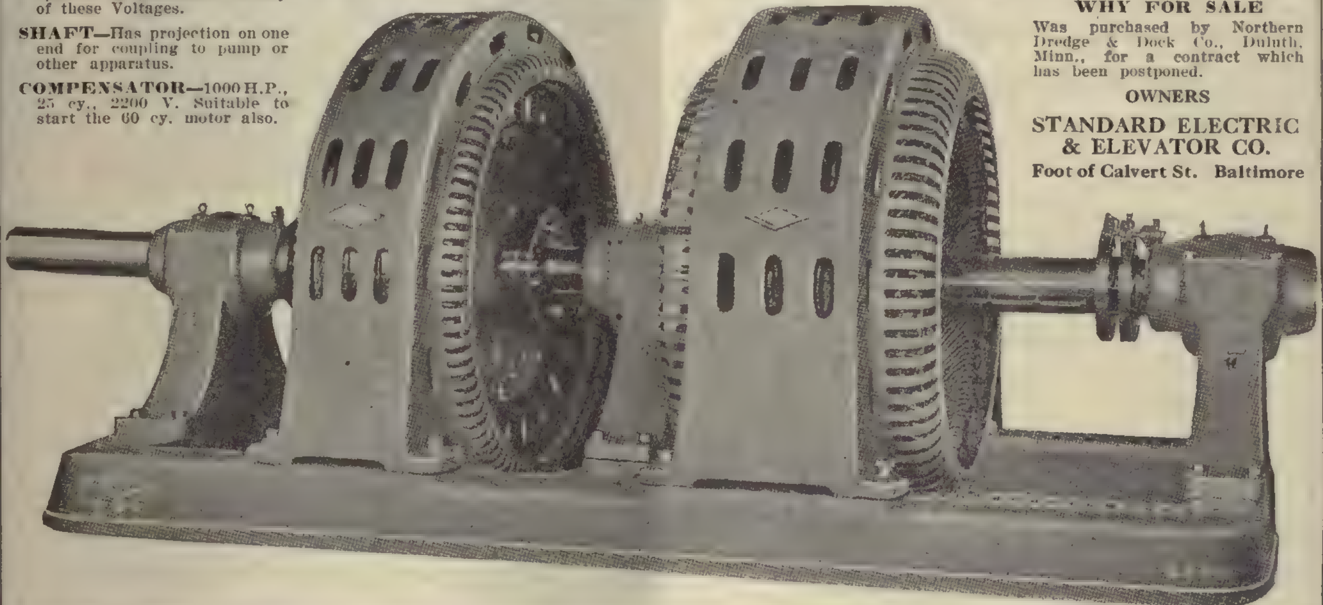
FOR plants having the two frequencies and to tie in breakdown services with isolated plants.

**WHY FOR SALE**

Was purchased by Northern Dredge & Dock Co., Duluth, Minn., for a contract which has been postponed.

**OWNERS**

STANDARD ELECTRIC & ELEVATOR CO.
**Foot of Calvert St. Baltimore**



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## IMMEDIATE SHIPMENT

100 tons of 62 lb. Shanghai rails, together with bars, rails practically as good as new, ready for quick shipment.

Also one direct connected Ridgway Dynamo and Engine, 200 volt, 550 KW., as good as new. Wire for prices.

**M. K. FRANK**
**Frick Building, Pittsburgh, Pa.**

---

FOR SALE

## Overhead Steel Bridge

Skew 63° 8′. Designed for two 60-ton Interurban cars. Main span of two through plate girders 53 feet long supported on four channel columns. Approaches of four 24″ 80-lb. I-beams, average length 29 ft. 6 in. Will sell entire bridge or any separate member.

**Indiana Railways & Light Company**
Kokomo, Indiana.

---

## CAR BARGAINS

OPEN and CLOSED
MOTOR and TRAIL

*Write for Price and Full Particulars to*

ELECTRIC EQUIPMENT Co.
601 Commonwealth. Bldg Phila Pa

---

FOR SALE

**300 "A" Frame**

and

**One Square, Black Iron Archbald**

## Flexible Towers

in exceptionally good condition, having been painted during last Spring and never been in service. "A" Frame Tower weighs complete 1800 lbs., square tower 3700 lbs. complete. For further detailed information

Address PURCHASING AGENT
Alabama Power Company
Birmingham, Alabama

---

## Generating Units

FOR SALE

Two 500-hp. Bass Corliss cross-compound Steam Engines direct connected to Westinghouse Generators, 375 kw., 550-volts.

First-class running condition.

Will be sold cheap.

**Federal Iron & Steel Company**
Newark, N. J.

---

RAILS CARS

## Dollar-Saving Bulletin

Send for the last one, No. 220—the best 2c. investment you ever made.

**ZELNICKER IN ST. LOUIS**

EQUIPMENT MACHINERY

---

## IMMEDIATE SHIPMENT

1—300 K.W. Westinghouse, compound wound, 3 bearing, belt-driven

## Generator

speed 435 R.P.M., 550 volts.

**LEO A. PHILLIPS**
Steam & Electrical Equipment
90 West Street New York City

---

CLEVELAND ARMATURE WORKS
Cleveland, Ohio

## Everything in the Line of Repairs to Electrical Machinery

Complete Armatures, New Armatures, Rewound Armature Cores, Armature Shafts, Armature Coils, Fields and Commutators.

Established 22 Years.

# WHAT AND WHERE TO BUY

## Equipment, Apparatus and Supplies Used by the Electric Railway Industry with Names of Manufacturers and Distributors

**Acetylene Service and Apparatus.**
Oxweld Acetylene Co.

**Advertising, Street Car.**
Collier, Inc., Barron G.

**Air Cleaners and Rectifiers.**
Horne Mfg. Co.

**Alloys, Steel and Iron. (See also Bearings and Bearing Metals.)**
Titanium Alloy Mfg. Co.

**Anchors, Guy.**
Electric Service Supplies Co.
Holden & White, Inc.
Ohio Brass Co.
Western Electric Co.
Westinghouse Elec. & M. Co.

**Anti-Climbers.**
Railway Improvement Co.

**Automobiles and Buses.**
Brill Co., The J. G.

**Axle Straighteners.**
Columbia M. W. & M. I. Co.

**Axles, Car Wheel.**
Bemis Car Truck Co.
Brill Co., The J. G.
Carnegie Steel Co.
National Tube Co.
St. Louis Car Co.
Standard Steel Works Co.
Westinghouse Elec. & M. Co.

**Babbitting Devices.**
Columbia M. W. & M. I. Co.

**Badges and Buttons.**
Electric Service Supplies Co.
International Register Co., The
Western Electric Co.

**Bankers and Brokers.**
National City Co.

**Batteries, Dry.**
Western Electric Co.

**Batteries, Storage.**
Electric Storage Battery Co.
Western Electric Co.

**Bearings & Bearing Metals.**
Ajax Metal Co.
Bemis Car Truck Co.
Columbia M. W. & M. I. Co.
Eureka Co.
General Electric Co.
Kerschner Co., Inc., W. R.
Long Co., E. G.
More-Jones, B. & M. Co.
St. Louis Car Co.
Westinghouse Elec. & M. Co.

**Bearings, Center and Roller Side.**
Baldwin Locomotive Works.
Holden & White, Inc.

**Bearings, Roller and Ball.**
Gurney Ball-Bearing Co.
Railway Roller Bearing Co.

**Bells and Gongs.**
Brill Co., The J. G.
Columbia M. W. & M. I. Co.
Electric Service Supplies Co.
St. Louis Car Co.
Western Electric Co.

**Benders, Rail.**
Niles-Bement-Pond Co.
Western Electric Co.
Zelnicker Sup. Co., W. A.

**Boilers.**
Babcock & Wilcox Co.

**Boiler Cleaning Compounds.**
Dearborn Chemical Co.

**Boiler Tubes.**
National Tube Co.

**Bond Testers.**
American Steel & Wire Co.

**Bonding Apparatus.**
American Steel & Wire Co.
Electric Service Supplies Co.
Ohio Brass Co.
Oxweld Acetylene Co.

**Bonds, Rail.**
American Steel & Wire Co.
Electric Service Supplies Co.
General Electric Co.
Lincoln Bonding Co.
Ohio Brass Co.
Westinghouse Elec. & M. Co.

**Book Publishers.**
McGraw-Hill Book Co., Inc.

**Boring Tools, Car Wheel.**
Niles-Bement-Pond Co.

**Braces, Rail.**
Kilby Frog & Switch Co.

**Brackets and Cross Arms. (See also Poles, Ties, Posts, Etc.)**
Bates Expanded Steel Truss Co.
Electric Service Supplies Co.
Hubbard & Co.
Lindsley Bros. Co.
Ohio Brass Co.
Western Electric Co.

**Brake Adjusters.**
Holden & White, Inc.
Smith-Ward Brake Co.

**Brake Shoes.**
Amer. Brake Shoe & Fdry. Co.
Brill Co., The J. G.
Columbia M. W. & M. I. Co.
Long Co., E. G.
St. Louis Car Co.

**Brakes, Brake Systems and Brake Parts.**
Allis-Chalmers Mfg. Co.
Bemis Car Truck Co.
Brill Co., The J. G.
Columbia M. W. & M. I. Co.
General Electric Co.
Holden & White, Inc.
Horne Mfg. Co.
Long Co., E. G.
St. Louis Car Co.
Westinghouse Trac. B. Co.

**Brooms, Track, Steel or Rattan.**
Western Electric Co.
Zelnicker Supply Co., W. A.

**Brush Holders.**
Anderson Mfg. Co., A. & J. M.
Columbia M. W. & M. I. Co.
Eureka Co.

**Brushes, Carbon.**
American Carbon & Battery Co.
General Electric Co.
Jeandron, W. J.
Morgan Crucible Co.
Western Electric Co.
Westinghouse Elec. & M. Co.

**Brushes, Graphite.**
Dixon Crucible Co., Jos.

**Bushings, Case Hardened and Manganese.**
Bemis Car Truck Co.

**Bushings, Fibre.**
Diamond State Fibre Co.

**Cables. (See Wires and Cables.)**

**Carbon Brushes. (See Brushes, Carbon.)**

**Car Equipment. (For Fenders, Heaters, Registers, Wheels, etc.—See those headings.)**

**Car Trimmings. (For Curtains, Registers, Doors, Seats, etc. — See those headings.)**

**Cars, Passenger, Freight, Express, etc.**
American Car Co.
Brill Co., The J. G.
Jewett Car Co.
Kuhlman Car Co., G. C.
St. Louis Car Co.
Stephenson Co., John
Wason Mfg. Co.

**Cars, Second Hand.**
Electric Equipment Co.
Kerschner Co., Inc., W. R.

**Cars, Self-Propelled.**
Electric Storage Battery Co.
General Electric Co.

**Castings, Brass, Composition or Copper.**
Anderson Mfg. Co., A. & J. M.
Columbia M. W. & M. I. Co.
Eureka Co.
Frankel Connector Co.
Horne Mfg. Co.
More-Jones B. & M. Co.

**Castings, Gray Iron and Steel.**
Amer. Brake Shoe & Fdry. Co.
Bemis Car Truck Co.
Columbia M. W. & M. I. Co.
Horne Mfg. Co.
Long Co., E. G.
St. Louis Car Co.
Standard Steel Works Co.
Union Spring & Mfg. Co.

**Castings, Malleable and Brass.**
Amer. Brake Shoe & Fdry. Co.
Bemis Car Truck Co.
Columbia M. W. & M. I. Co.
Horne Mfg. Co.
Long Co., E. G.
St. Louis Car Co.

**Catchers and Retrievers, Trolley.**
Earll, C. I.
Electric Service Supplies Co.
Holden & White, Inc.
Horne Mfg. Co.
Kerschner Co., Inc., W. R.
Long Co., E. G.
Ohio Brass Co.
Wood Co., Chas. N.

**Ceiling, Car.—(See Head Lining.)**

**Chemists.**
Little, Inc., Arthur D.

**Circuit Breakers.**
Cutter Electrical & Mfg. Co.
General Electric Co.
Western Electric Co.
Westinghouse Elec. & M. Co.

**Clamps and Connectors for Wires and Cables.**
Anderson Mfg. Co., A. & J. M.
Electric Service Supplies Co.
Frankel Connector Co.
General Electric Co.
Hubbard & Co.
Klein & Sons, Mathias.
Ohio Brass Co.
Western Electric Co.
Westinghouse Elec. & M. Co.

**Cleaners and Scrapers, Track.—(See also Snow-Plows, Sweepers and Brooms.)**
Brill Co., The J. G.
Ohio Brass Co.
Root Spring Scraper Co.
Van Dorn & Dutton Co.
Western Electric Co.

**Clusters and Sockets.**
General Electric Co.

**Coal and Ash Handling.—(See Conveying and Hoisting Machinery.)**

**Coasting Recorders.**
Railway Improvement Co.

**Coil Banding and Winding Machines.**
Columbia M. W. & M. I. Co.
Electric Service Supplies Co.
Western Electric Co.

**Coils, Armature and Field.**
Cleveland Armature Works
Columbia M. W. & M. I. Co.
D & W Fuse Co.
General Electric Co.
Independent Lamp & Wire Co.
Westinghouse Elec. & M. Co.

**Coils, Choke and Kicking.**
Electric Service Supplies Co.
General Electric Co.
Westinghouse Elec. & M. Co.

**Coin-Counting Machines.**
International Register Co., The

**Commutator Slotters.**
Electric Service Supplies Co.
General Electric Co.
Westinghouse Elec. & M. Co.
Wood Co., Chas. N.

**Commutator Truing Devices.**
General Electric Co.

**Commutators or Parts.**
Cleveland Armature Works
Columbia M. W. & M. I. Co.
Eureka Co.
General Electric Co.
Long Co., E. G.
Western Electric Co.
Westinghouse Elec. & M. Co.

**Compressors, Air.**
Allis-Chalmers Mfg. Co.
General Electric Co.
Westinghouse Trac. B. Co.

**Condensers.**
Allis-Chalmers Mfg. Co.
General Electric Co.
Westinghouse Elec. & M. Co.

**Conduits.**
Western Electric Co.

**Connectors, Solderless.**
Frankel Connector Co.
Horne Mfg. Co.

**Controller Regulators.**
Electric Service Supplies Co.

**Controllers or Parts.**
Allis-Chalmers Mfg. Co.
Columbia M. W. & M. I. Co.
Electric Service Supplies Co.
General Electric Co.
Horne Mfg. Co.
Kerschner Co., Inc., W. R.
Westinghouse Elec. & M. Co.

**Controlling Systems**
General Electric Co.
Westinghouse Elec. & M. Co.

**Converters, Rotary.**
Allis-Chalmers Mfg. Co.
General Electric Co.
Western Electric Co.
Westinghouse Elec. & M. Co.

**Conveying and Hoisting Machinery.**
Columbia M. W. & M. I. Co.
Green Engrg. Co.

**Cord, Bell, Trolley, Register, etc.**
Brill Co., The J. G.
Electric Service Supplies Co.
International Register Co., The
Long Co., E. G.
Roebling's Sons Co., John A.
Samson Cordage Works

**Cord Connectors and Couplers.**
Electric Service Supplies Co.
Samson Cordage Works
Wood Co., Chas. N.

**Couplers, Car.**
Brill Co., The J. G.
Long Co., E. G.
Ohio Brass Co.
Van Dorn Coupler Co.
Westinghouse Trac. B. Co.

**Couplings, Conduit.**
Horne Mfg. Co.

**Cranes.—(See also Hoists.)**
Allis-Chalmers Mfg. Co.
Niles-Bement-Pond Co.
Van Dorn & Dutton Co.

**Creosoting. (See Wood Preservatives.)**

**Cross Arms. (See Brackets.)**

**Crossing Foundations.**
International Steel Tie Co.

**Crossing Signals. (See Signals, Crossing.)**

**Crossings, Track. (See Track, Special Work.)**

**Crushers, Rock**
Allis-Chalmers Mfg. Co.

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Elastic Car Waste

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- C. & C. Electric & Mfg. Co.
- Holden & White

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Eastern Agents for Union Fibre Co.

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# WHAT AND WHERE TO BUY

**Culverts.**
Canton Culvert & Silo Co.

**Curtains and Curtain Fixtures.**
Brill Co., The J. G.
Electric Service Supplies Co.
Hartshorn Company, Stewart
Pantasote Co., The
St. Louis Car Co.

**Derailing Devices. (See also Track Work.)**
Cleveland Frog & Crossing Co.

**Destination Signs.**
Columbia M. W. & M. I. Co.
Electric Service Supplies Co.

**Detective Service.**
Wisch Service, P. Edward

**Dispatching Systems.**
Simmen Automatic Ry. Sig. Co.
Western Electric Co.

**Door Operating Devices.**
Consolidated Car Heating Co.

**Doors and Door Fixtures.**
Brill Co., The J. G.
General Electric Co.
Hale & Kilburn Co.

**Doors & Shutters, Fireproof.**
Kinnear Mfg. Co.

**Doors, Steel Rolling.**
Kinnear Mfg. Co.

**Draft Rigging. (See Couplers.)**

**Drills, Track.**
American Steel & Wire Co.
Electric Service Supplies Co.
Long Co., E. G.
Niles-Bement-Pond Co.
Ohio Brass Co.

**Dryers, Sand.**
Electric Service Supplies Co.
Zelnicker Sup. Co., W. A.

**Engineers, Consulting, Contracting and Operating.**
Archbold-Brady Co.
Arnold Co., The
Beeler, John A.
Byllesby & Co., Inc., H. M.
Drum & Co., A. L.
Ford, Bacon & Davis
Hunt & Co., Robert W.
Jackson, D. C. & Wm. B.
Little, Inc., Arthur D.
Richey, Albert S.
Sanderson & Porter
Scofield Engineering Co.
Stone & Webster Eng. Corp.
White Companies, J. G.
Woodmansee & Davidson, Inc.

**Engines, Gas and Oil.**
Allis-Chalmers Mfg. Co.
Westinghouse Elec. & M. Co.

**Engines, Steam.**
Allis-Chalmers Mfg. Co.
Westinghouse Elec. & M. Co.

**Fare Boxes.**
Brill Co., The J. G.
Cleveland Fare Box Co.
International Register Co., The

**Fences, Woven Wire and Fence Posts.**
American Steel & Wire Co.
Page Woven Wire Fence Co.

**Fenders and Wheel Guards.**
Brill Co., The J. G.
Cleveland Fare Box Co.
Consolidated Car Fender Co.
Electric Service Supplies Co.
Horne Mfg. Co.
Root Spring Scraper Co.
Star Brass Works
Western Electric Co.

**Fibre Insulation.**
National Ry. Appliance Co.

**Fibre and Fibre Tubing.**
Diamond State Fibre Co.
Westinghouse Elec. & M. Co.

**Field Coils. (See Coils.)**

**Flooring Composition.**
American Mason Safety Tread Co.
Western Electric Co.

**Forgings.**
Eureka Co.
Standard Steel Works Co.

**Frogs, Track. (See Track Work.)**

**Furnaces. (See Stokers.)**

**Fuses and Fuse Boxes.**
Columbia M. W. & M. I. Co.
D & W Fuse Co.
Daum, A. F.
General Electric Co.
Western Electric Co.
Westinghouse Elec. & M. Co.

**Fuses, Refillable.**
Columbia M. W. & M. I. Co.
General Electric Co.
Horne Mfg. Co.

**Gaskets.**
Diamond State Fibre Co.
Power Specialty Co.

**Gas Producers.**
Westinghouse Elec. & M. Co.

**Gates, Car.**
Brill Co., The J. G.
Jewett Car Co.

**Gages, Oil and Water.**
Ohio Brass Co.

**Gear Blanks.**
Carnegie Steel Co.
Diamond State Fibre Co.
Standard Steel Works Co.

**Gear Cases.**
Columbia M. W. & M. I. Co.
Electric Service Supplies Co.
Kerschner Co., Inc., W. R.
National Ry. Appliance Co.
Westinghouse Elec. & M. Co.

**Gears and Pinions.**
Columbia M. W. & M. I. Co.
Diamond State Fibre Co.
Electric Service Supplies Co.
General Electric Co.
Kerschner Co., Inc., W. R.
Long Co., E. G.
National Ry. Appliance Co.
Nuttall Co., R. D.
Van Dorn & Dutton Co.

**Generating Sets, Gas-Electric.**
General Electric Co.

**Generators.**
General Electric Co.
Western Electric Co.
Westinghouse Elec. & M. Co.

**Gongs. (See Bells and Gongs.)**

**Graphite.**
Dixon Crucible Co., Joseph
Morgan Crucible Co.

**Greases. (See Lubricants.)**

**Grinders and Grinding Supplies.**
General Electric Co.
Railway Track-work Co.
Western Electric Co.

**Guards, Trolley.**
Electric Service Supplies Co.
Ohio Brass Co.

**Harps, Trolley.**
Anderson M. Co., A. & J. M.
Electric Service Supplies Co.
More-Jones B. & M. Co.
Nuttall Co., R. D.
Star Brass Works.
Western Electric Co.

**Headlights.**
Electric Service Supplies Co.
General Electric Co.
Kerschner Co., Inc., W. R.
Long Co., E. G.
Ohio Brass Co.
St. Louis Car Co.
Westinghouse Elec. & M. Co.

**Headlining.**
Kerschner Co., Inc., W. R.
Pantasote Co., The.

**Heaters, Car (Electric).**
Consolidated Car Heating Co.
Gold Car Heating & Lighting Co.
Smith Heater Co., Peter.

**Heaters, Car, Hot Air and Water.**
Cooper Heater Co.
Smith Heater Co., Peter.

**Heaters, Car (Stove).**
Electric Service Supplies Co.
Smith Heater Co., Peter.

**Hoists and Lifts.**
Columbia M. W. & M. I. Co.
Duff Mfg. Co.
Ford Chain Block & Mfg. Co.
Niles-Bement-Pond Co.
Van Dorn & Dutton Co.
Yale & Towne Mfg. Co.

**Hose, Bridges.**
Ohio Brass Co.

**Hydraulic Machinery.**
Niles-Bement-Pond Co.

**Hydrogrounds.**
Horne Mfg. Co.

**Inspection.**
Electrical Testing Lab's.
Hunt & Co., Robt. W.

**Instruments, Measuring, Testing and Recording.**
General Electric Co.
Sangamo Electric Co.
Western Electric Co.
Westinghouse Elec. & M. Co.
Weston Elec'l Instrument Co.

**Insulating Cloth, Paper and Tape.**
Diamond State Fibre Co.
General Electric Co.
Sherwin-Williams Co.
Standard Woven Fabric Co.
Western Electric Co.
Westinghouse Elec. & M. Co.

**Insulations. (See also Paints.)**
Anderson M. Co., A. & J. M.
Diamond State Fibre Co.
Electric Service Supplies Co.
General Electric Co.
Holden & White, Inc.
Sherwin-Williams Co.
Western Electric Co.
Westinghouse Elec. & M. Co.

**Insulators. (See also Line Material.)**
Anderson M. Co., A. & J. M.
Electric Service Supplies Co.
General Electric Co.
Ohio Brass Co.
Western Electric Co.
Westinghouse Elec. & M. Co.

**Insulator Pins.**
Hubbard & Co.

**Jacks. (See also Cranes, Hoists and Lifts.)**
Brill Co., The J. G.
Buckeye Jack Mfg. Co.
Columbia M. W. & M. I. Co.
Duff Manufacturing Co.
National Ry. Appliance Co.

**Joints, Rail.**
Atlantic Welding Co.
Carnegie Steel Co.
Lackawanna Steel Co.
Zelnicker Sup. Co., W. A.

**Journal Boxes.**
Bemis Car Truck Co.
Brill Co., The J. G.
Long Co., E. G.
Railway Roller Bearing Co.

**Laboratory.**
Electric Testing Lab's.
Little, Inc., Arthur D.

**Lamp Guards and Fixtures.**
Anderson M. Co., A. & J. M.
Electric Service Supplies Co.
General Electric Co.
Westinghouse Elec. & M. Co.

**Lamps, Arc and Incandescent. (See also Headlights.)**
Anderson M. Co., A. & J. M.
General Electric Co.
Western Electric Co.
Westinghouse Elec. & M. Co.

**Lamps, Signal and Marker.**
Ohio Brass Co.

**Lathes, Car Wheel.**
Niles-Bement-Pond Co.

**Lighting Regulators, Car.**
Holden & White, Inc.

**Lightning Protection.**
Anderson M. Co., A. & J. M.
Electric Service Supplies Co.
General Electric Co.
Horne Mfg. Co.
Ohio Brass Co.
Western Electric Co.
Westinghouse Elec. & M. Co.

**Line Material. (See also Brackets, Insulators, Wires, etc.)**
Anderson M. Co., A. & J. M.
Columbia M. W. & M. I. Co.
Diamond State Fibre Co.
Electric Service Supplies Co.
Eureka Co.
General Electric Co.
Holden & White, Inc.
Hubbard & Co.
More-Jones B. & M. Co.
Ohio Brass Co.
Western Electric Co.
Westinghouse Elec. & M. Co.

**Locks.**
Yale & Towne Mfg. Co.

**Locomotives, Electric.**
Baldwin Locomotive Works.
Brill Co., The J. G.
General Electric Co.
Westinghouse Elec. & M. Co.

**Lubricating Engines.**
Galena-Signal Oil Co.

**Lubricants, Oil and Grease.**
Dearborn Chemical Co.
Dixon Crucible Co., Jos.
Galena-Signal Oil Co.

**Lumber. (See Poles, Ties, etc.)**

**Machine Tools.**
Columbia M. W. & M. I. Co.
Niles-Bement-Pond Co.

**Machine Work.**
Columbia M. W. & M. I. Co.
Horne Mfg. Co.

**Meters. (See Instruments.)**

**Meters, Car, Watt-Hour.**
Sangamo Electric Co.

**Mica.**
Long Co., E. G.

**Motormen's Seats.**
Electric Service Supplies Co.
Wood Co., Chas. N.

**Motors, Electric.**
General Electric Co.
Western Electric Co.
Westinghouse Elec. & M. Co.

**Motor Generation, Bonding and Welding.**
Lincoln Bonding Co.

**Nuts and Bolts.**
Bemis Car Truck Co.
Columbia M. W. & M. I. Co.
Hubbard & Co.
Lackawanna Steel Co.
Long Co., E. G.
National Railway Appliance Co.

**Oils. (See Lubricants.)**

**Oxy-Acetylene. (See Cutting Apparatus, Oxy-Acetylene.)**

**Packing.**
Diamond State Fibre Co.
Electric Service Supplies Co.
Horne Mfg. Co.
Power Specialty Co.

**Paints and Varnishes. (Insulating.)**
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Long Co., E. G.
Sherwin-Williams Co.

**E. G. Long Company**

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Long Co., E. G.
National Ry. Appliance Co.
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National Ry. Appliance Co.
Sherwin-Williams Co.

**Paving Bricks, Filler and Stretcher.**
Nelsonville Brick Co.

**Paving Material.**
Am. Brake Shoe & Fdy. Co.
Barrett Co., The.
Nelsonville Brick Co.

**Paving Pitch.**
Barrett Co., The.

**Pickups, Trolley Wire.**
Electric Service Supplies Co.
Ohio Brass Co.

**Pinion Pullers.**
Columbia M. W. & M. I. Co.
Electric Service Supplies Co.
General Electric Co.
Wood Co., Chas. N.

**Pinions. (See Gears.)**

**Pins, Case Hardened, Wood and Iron.**
Bemis Car Truck Co.
Electric Service Supplies Co.
Long Co., E. G.
Ohio Brass Co.

**Pipe.**
National Tube Co.

**Pipe Fittings.**
National Tube Co.
Power Specialty Co.
Standard Steel Works Co.

**Planers. (See Machine Tools.)**

**Pole Reinforcing.**
Hubbard & Co.

**Poles and Ties, Treated.**
Lindsley Bros. Co.
Western Electric Co.

**Poles, Metal Street.**
Bates Expanded Steel Truss Co.
Hubbard & Co.
National Tube Co.

**Poles, Ties, Posts, Piling and Lumber.**
Carney & Co., B. J.
Lindsley Bros. Co.
Western Electric Co.

**Poles, Trolley.**
Anderson M. Co., A. & J. M.
Columbia M. W. & M. I. Co.
Electric Service Supplies Co.
Long Co., E. G.
National Tube Co.
Nuttall Co., R. D.

**Power Saving Devices.**
Arthur Power-Saving Recorder Co.
Railway Improvement Co.

**Pressure Regulators.**
General Electric Co.
Ohio Brass Co.

**Punches, Ticket.**
Bonney-Vehslage Tool Co.
International Register Co., The.
Wood Co., Chas. N.

**Rail Grinders. (See Grinders.)**

**Rail Welding. (See Brazing and Welding Processes.)**

**Rails, Relaying.**
Zelnicker Supply Co., W. A.

**Rattan.**
Brill Co., The J. G.
Electric Service Supplies Co.
Hale & Kilburn Co.
Jewett Car Co.
St. Louis Car Co.

**Recorders, Power Saving.**
Arthur Power-Saving Recorder Co.

# WHAT AND WHERE TO BUY

**Registers and Fittings.**
Bonham Recorder Co.
Brill Co., The J. G.
Electric Service Supplies Co.
International Register Co., The.
Long Co., E. G.
Rooke Automatic Register Co.

**Reinforcement, Concrete.**
American Steel & Wire Co.

**Repair Shop Appliances. (See also Coil Banding and Winding Machines.)**
Columbia M. W. & M. I. Co.
Electric Service Supplies Co.

**Repair Work. (See also Coils.)**
Cleveland Armature Works.
Columbia M. W. & M. I. Co.
General Electric Co.
Independent Lamp & Wire Co.
Westinghouse Elec. & M. Co.

**Replacers, Car.**
Columbia M. W. & M. I. Co.
Electric Service Supplies Co.

**Resistance, Grid.**
Columbia M. W. & M. I. Co.

**Resistance, Wire and Tube.**
General Electric Co.
Western Electric Co.
Westinghouse Elec. & M. Co.

**Retrievers, Trolley. (See Catchers and Retrievers, Trolley.)**

**Rheostats.**
General Electric Co.
Westinghouse Elec. & M. Co.

**Roofing, Building.**
Barrett Co., The.

**Roofing, Car.**
Pantasote Co., The.

**Sand Blasts.**
National Ry. Appliance Co.

**Sanders, Track.**
Brill Co., The J. G.
Cleveland Fare Box Co.
Columbia M. W. & M. I. Co.
Electric Service Supplies Co.
Horne Mfg. Co.
Holden & White, Inc.
Jewett Car Co.
Ohio Brass Co.
St. Louis Car Co.

**Sash Fixtures, Car.**
Brill Co., The J. G.

**Sash Metal, Car Window.**
Hale & Kilburn Co.

**Sash Operators.**
Drouvé Co., The G.

**Scales, Weights, Balances and Dynamometers.**
Horne Mfg. Co.

**Scrapers, Track. (See Cleaners and Scrapers, Track.)**

**Seating Material. (See also Rattan.)**
Pantasote Co., The.

**Seats, Car.**
Brill Co., The J. G.
Hale & Kilburn Co.
Jewett Car Co.
St. Louis Car Co.

**Second-Hand Equipment. (See also pages 41-43.)**
Archer & Baldwin.
Kerschner Co., Inc., W. R.
MacGovern & Co., Inc.

**Shade Rollers.**
Hartshorn Co., Stewart.

**Shades, Vestibule.**
Brill Co., The J. G.
Electric Service Supplies Co.

**Shovels.**
Hubbard & Co.

**Signal Systems, Block.**
Electric Service Supplies Co.
Federal Signal Co.
Nachod Signal Co., Inc.
Simmen Automatic Railway Signal Co.
Western Electric Co.
Wood Co., Chas. N.

**Signals, Car Starting.**
Consolidated Car Heating Co.

**Signals, Highway Crossing.**
Electric Service Supplies Co.
Nachod Signal Co., Inc.

**Skylights, Steel Puttyless.**
Drouvé Co., The G.

**Slack Adjusters. (See Brake Adjusters.)**

**Sleet Wheels and Cutters.**
Anderson Mfg. Co., A. & J. M.
Bonney-Vehslage Tool Co.
Columbia M. W. & M. I. Co.
Holden & White, Inc.
More-Jones B. & M. Co.
Nuttall Co., R. D.

**Snow-Plows, Sweepers and Brooms.**
Brill Co., The J. G.
Columbia M. W. & M. I. Co.
Consolidated Car Fender Co.

**Soaps.**
Sherwin-Williams Co.

**Soldering and Brazing Apparatus. (See Welding, Processes and Apparatus.)**

**Spikes.**
American Steel & Wire Co.
Lackawanna Steel Co.

**Splicing Compounds.**
Standard Woven Fabric Co.
Westinghouse Elec. & M. Co.

**Splicing Sleeves. (See Clamps and Connectors.)**

**Springs, Car & Truck.**
American Steel & Wire Co.
Bemis Car Truck Co.
Brill Co., The J. G.
Long Co., E. G.
Standard Steel Works Co.
Union Spring & Mfg. Co.

**Sprinklers, Track & Road.**
Brill Co., The J. G.
St. Louis Car Co.

**Steps, Car.**
American Mason S. T. Co.
Universal Safety Tread Co.

**Stokers, Mechanical.**
Babcock & Wilcox Co.
Green Engrg. Co
Murphy Iron Works.
Westinghouse Elec. & M. Co.

**Storage Batteries. (See Batteries, Storage.)**

**Straps, Car, Sanitary.**
Holden & White, Inc.
Railway Improvement Co.

**Structural Iron. (See Bridges.)**

**Sub Stations.**
Delta Star Electric Co.

**Superheaters.**
Babcock & Wilcox Co.
Power Specialty Co.

**Sweepers, Snow. (See Snow Plows, Sweepers & Brooms.)**

**Switchboard Mats.**
Western Electric Co.

**Switch Stands.**
Kilby Frog & Switch Co.
Ramapo Iron Works.

**Switches, Automatic.**
Western Electric Co.

**Switches, Track. (See Track, Special Work.)**

**Switches & Switchboards.**
Anderson Mfg. Co., A. & J. M.
Cutter Electrical & Mfg. Co.
Delta Star Electric Co.
Electric Service Supplies Co.
General Electric Co.
Western Electric Co.
Westinghouse Elec. & M. Co.

**Tampers, Tie.**
Ingersoll-Rand Co.

**Tapes and Cloths. (See Insulating Cloths, Paper and Tape.)**

**Telephones and Parts.**
Electric Service Supplies Co.
Western Electric Co.

**Testing Clips.**
Frankel Connector Co.

**Testing, Commercial & Electrical.**
Elec'l Testing Laboratories.
Hunt & Co., Robert W.

**Testing Instruments. (See Instruments, Electrical Measuring, Testing, etc.)**

**Thermostats.**
Consolidated Car Heating Co.
Gold Car Heating & Lighting Co.
Railway Utility Co.
Smith Heater Co., Peter.

**Ticket Choppers & Destroyers.**
Electric Service Supplies Co.

**Ties and Tie Rods, Steel.**
Carnegie Steel Co.
International Steel Tie Co.

**Ties, Wood Cross. (See Poles, Ties, Posts, etc.)**

**Tools, Track & Miscellaneous.**
American Steel & Wire Co.
Columbia M. W. & M. I. Co.
Electric Service Supplies Co.
Hubbard & Co.
Klein & Sons, Mathias.
Railway Track-work Co.

**Torches, Acetylene. (See Cutting Apparatus.)**

**Towers & Transmission Structures.**
Archbold Brady Co.
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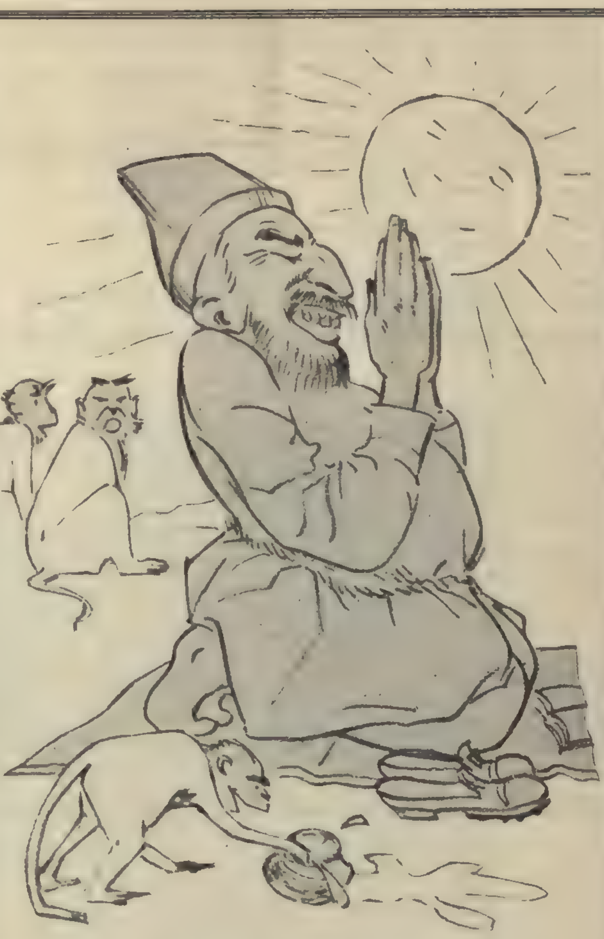

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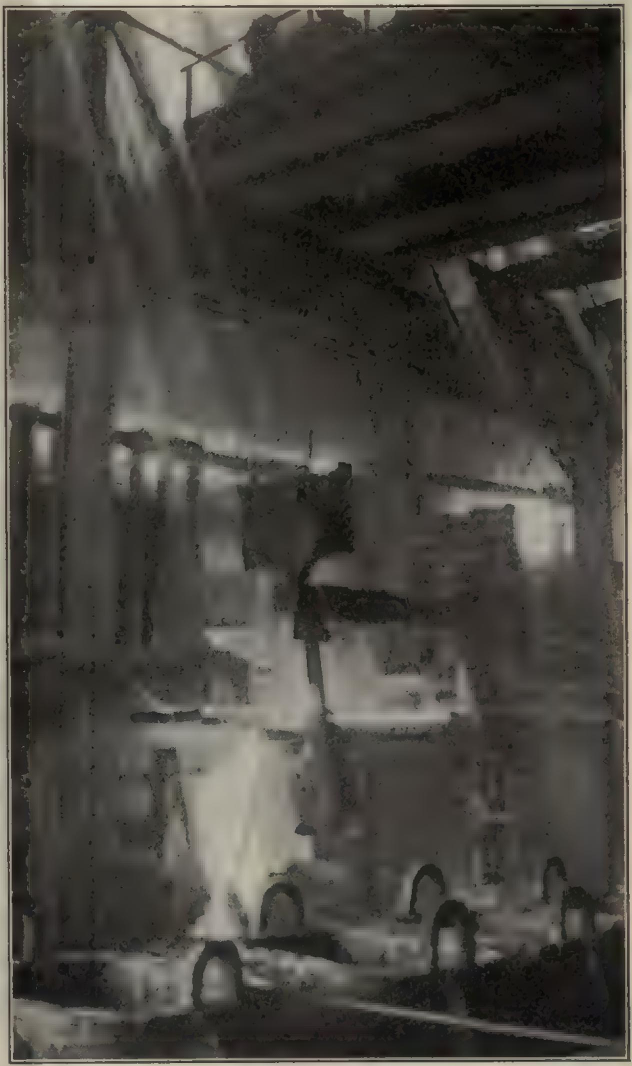
With Open Hearth Rails at $40 a Ton

Titanium Treatment

will pay
more
than ever



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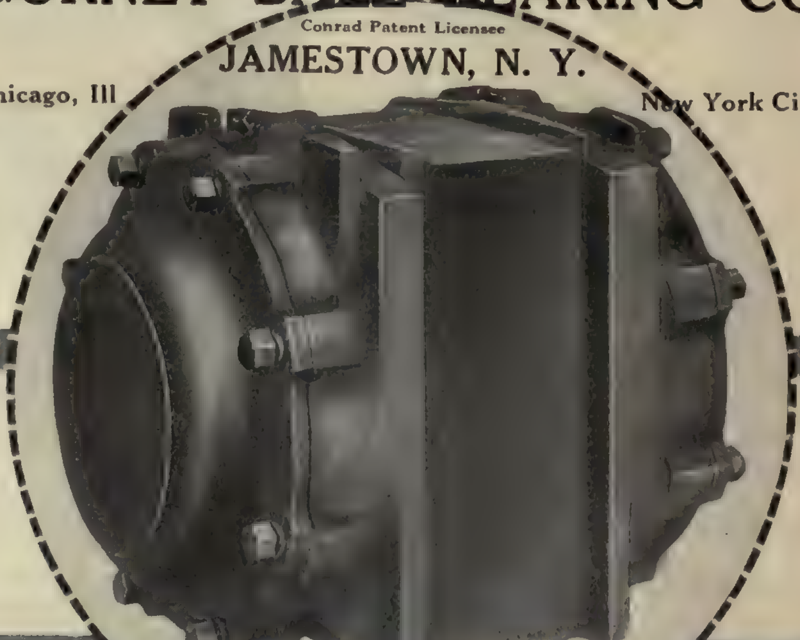

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| Columbus Ry. Pr. & Lt. Company | 1- 750 KW |
| Detroit Edison Company | 6- 1000 KW |
| Detroit United Railway | 2- 1500 KW |
| El Paso Electric Company | 1- 300 KW |
| Great Western Pr. Company | 3- 2000 KW |
| Holyoke St. Ry. Company | 1- 500 KW |
| Lincoln Traction Company | 1- 500 KW |
| Nashville Rwy. & Lt. Company | 1- 2000 KW |
| Pittsburgh, Harmony, Butler & New Castle Ry. | 2- 500 KW |
| Public Service Elect. Company | 1- 1000 KW |
| Public Utilities Company | 1- 1000 KW |
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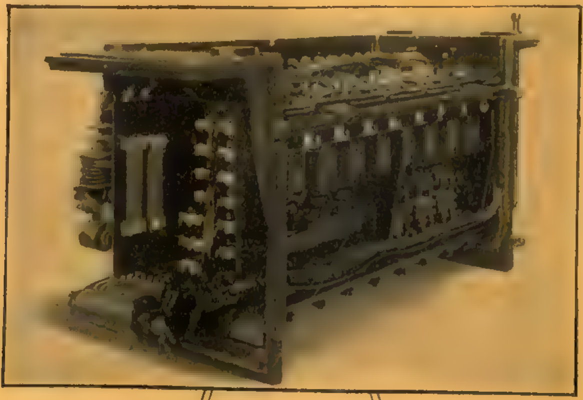

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**1910**

**Over 200 Users**
**1917**

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Top
Then
Why
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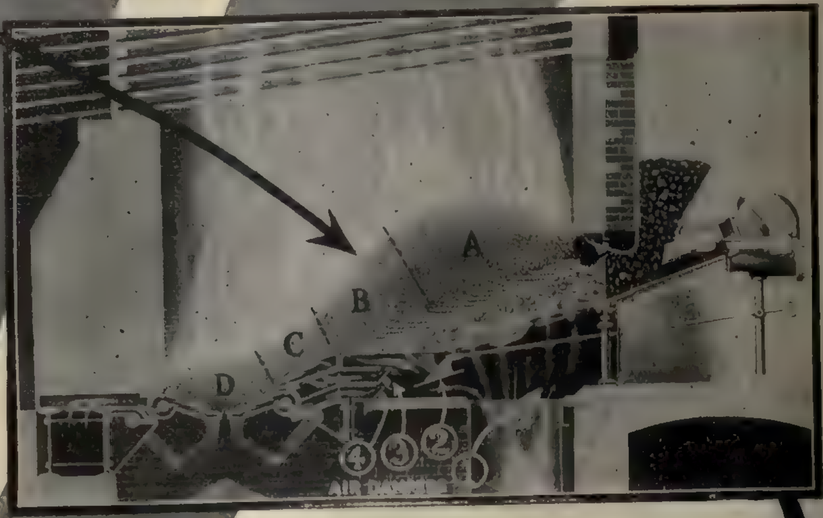

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O-B Type G-W Bond—Patented

**The Ohio Brass Company**

**Mansfield, Ohio**

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**has the habit of staying up**

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# INTERNATIONAL
## STEEL TWIN TIES

## *will let you make this saving.*

Did you ever stop to think that the concrete between the top and bottom of a wooden tie was valueless in your track structure? It's the 6 in. or 8 in. under the tie that does the work.

The effective bearing area of a Steel Twin Tie is at the base of rail. Seven inches of concrete below the base of rail is 7 in. in bearing in International standard track. As little as 5 in. below the tie plate has been in service under heavy interurban railway traffic for six years on The Union Traction Company's line. But with 7 in. below a Twin Tie plate you have 1 in. more than is generally used with wooden ties.

This radical departure in the tie construction cuts the excavation and concrete quantities 50 per cent under that required in track with wooden ties. That's where the saving in the cost of the job comes in. Let us prove that to you. Get in a sample installation this year and save in first cost as well as in maintenance.

Our large stock of low priced steel will insure prompt delivery at a moderate cost. Order while it lasts.

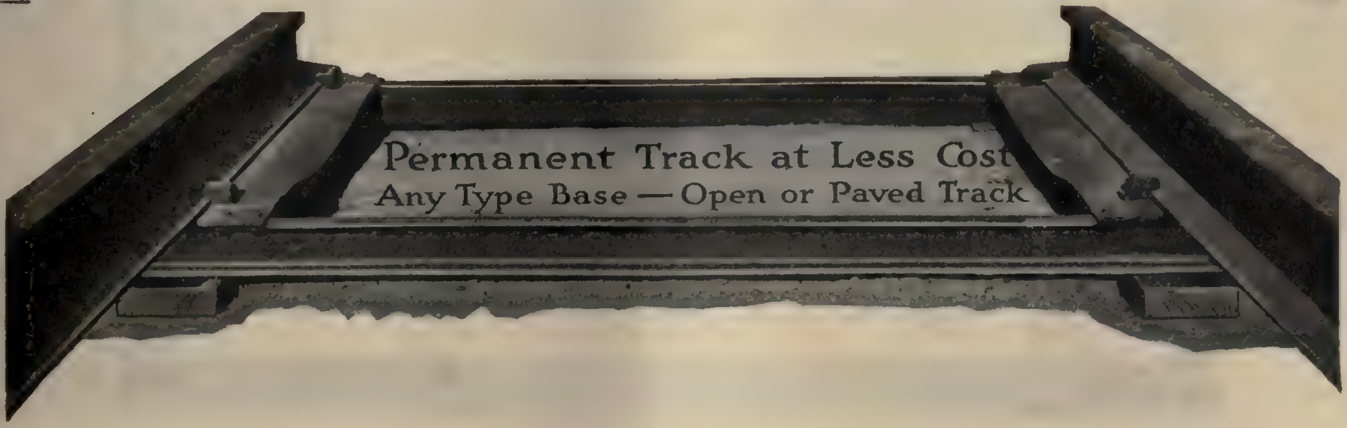
# The International Steel Tie Company

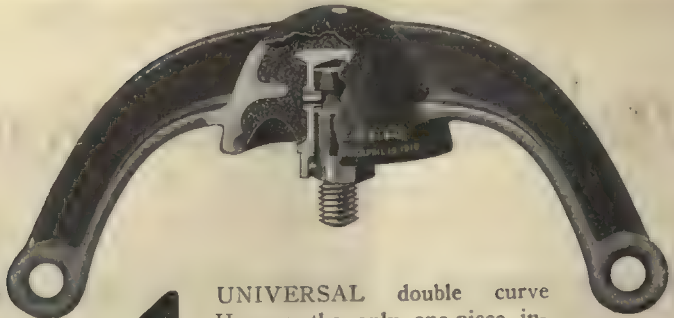
**Manufacturers of Steel Twin Ties and Crossing Foundations**

**General Sales Office and Works: Cleveland, Ohio**

REPRESENTATIVES:

Western Eng'g Sales Co., Los Angeles, Cal.
San Francisco, Cal. Seattle, Wash.
R. J. Cooper Co., Salt Lake City, Utah.
J. E. Lewis & Co., Dallas, Texas.
Maurice Joy, Philadelphia.
William H. Ziegler, Minneapolis, Minn.


Permanent Track at Less Cost
Any Type Base — Open or Paved Track



1 UNIVERSAL double curve Hanger, the only one-piece insulated pull-over now on the market. A great improvement over malleable iron yoke and separate insulators.

2 This UNIVERSAL one-piece straight line Hanger is a great improvement over the old type solid stud on the three-piece Hangers formerly used.

The revolving stud permits boss of ear to be drawn up tight against the Hanger face, relieving the threads from strain and insuring correct alignment of ear.

3 UNIVERSAL Hanger arranged for single curve pull-over.

The patented revolving stud permits line ears of any length to be attached to Hanger without the necessity of having removable arm as is required in similar Hangers with solid studs.

# CONSIDER

the Three UNIVERSAL Hangers shown on this page. They are worthy of your best attention.

They are one-piece Hangers, so that the disadvantages of the old three-piece Hangers are done away with.

Each Hanger has the revolving stud as an integral part of its construction. In your next order for trolley line material you'll specify these Hangers, especially if heavy suspension work on curves is to be undertaken.

Write now for further particulars.

**Electric Railway Equipment Co.**
Cincinnati, Ohio
New York: 30 Church St.

# Exceptional Products

## *Keystone Steel Gear Cases*

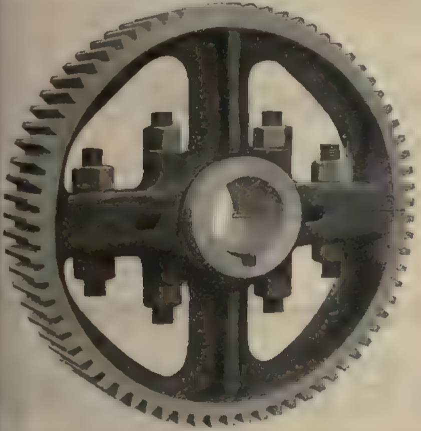
Gear cases must be built of steel of unquestioned strength, unaltered in quality during construction and made to fit exactly the foundations where they are to be installed. And, too, the brackets must be just right and the entire case must be both riveted and electrically spot-welded.

You can get some of these requirements in any gear case, but to get them all in one—you'll use the Keystone.

## *Keystone Trolley Catchers*

Watching the trolley pole and catching it when it "flies" is the work of the Keystone Trolley Catcher. It earns its value over and over again, for each time the pole starts to fly—one less "weak spot" in your overhead can be credited to the Keystone.

Keystone Catchers are the simplest and strongest. You'll see them on the cars of most large railways.



## *Nuttall Gears and Pinions*

Standard and special types of gears for railways, or any kind of a gear or pinion, forged or cast steel, split or solid and of various processes of manufacture to meet varying conditions of service. Put your gear problems up to us—we'll take full responsibility.

Eastern Agents for Nuttall-Pittsburgh.

## ELECTRIC SERVICE SUPPLIES CO.

*Manufacturer of Railway Material and Electrical Supplies*

**PHILADELPHIA**
**17th and Cambria Sts.**

**NEW YORK**
**50 Church St.**

**CHICAGO**
**Monadnock Bldg.**

# How to Give More Ca

"More Service
at Less Cost"
September 22

## *See Electric Railway Journal*
*September 22*

An electric railway car is just a tool for the manufacture of revenue car miles; and like any other tool its *rate of output* can be increased by suitable means such as:

Lower floors and steps

Highest practicable rates of acceleration and braking

Air operation of doors and steps

Control and braking interlocking of doors and steps

Elimination of extra movements in fare and transfer collection

In general, any device which by relieving the platform men of fatigue, facilitates the faster handling of the car and its passengers.

"More Service
at Less Cost"
September 22

As No Live Electric Railway Ma
So No Live Electric Railway Manufa

*Order Space and Copy Service Now!*

Electric Railway Jour

# Miles at Lower Expense

---

## *See Electric Railway Journal*
*September 22*

"More Service
at Less Cost"
September 22

So, too, the *quality of output* of an electric railway car can be bettered by suitable means, such as:

Ample non-glaring illumination

Minimum noise and maximum safety

Roomy, sanitary, correct posture seating

Automatically-regulated heating and ventilation

Non-slamming, non-catching doors, steps and sash

Finally, *frequency of service*, because the less time the passenger has to stand in the street, the more he will appreciate the comfort of electric railway travel.

"More Service
at Less Cost"
September 22

---

# Vill Fail to Read This Issue—
# er Will Fail to Advertise in This Issue

*Order Space and Copy Service Now!*

9 West 39th St., New York

# Conservation

---

## Collier Service

### *Conserves the Value of Your Car Advertising Space*

Only by giving continued satisfaction to the advertisers whose cards occupy the space in the cars, can the value of the advertising space be properly conserved.

Only such experience as is represented by Collier Service can establish and maintain the comprehensive nation-wide business relations so essential to the stability which maintains a continuous revenue to the railway company.

Conserve the value of your car advertising space by contracting with

Barron G. Collier INCORPORATED

**Candler Building**

**220 West 42nd Street, New York City**

12 STOPS
On the Road to Better Braking

Stop Cluttering up the front platform

You can get more free platform space by installing

HORNE DOUBLE-ACTING BRAKES

Note the compactness and small space they take up. No jutting handles to catch and tear clothing. They extend no further than the ordinary air brake equipment. They give your motormen more elbow room.

Horne Brakes are adaptable to any position.

Stop II

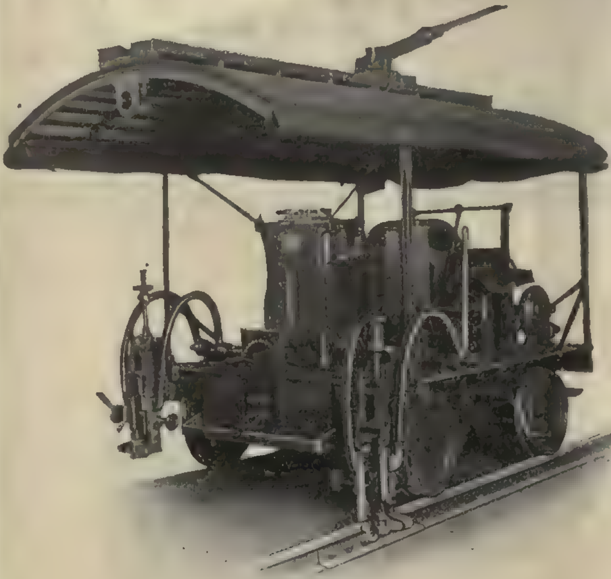
HORNE SPECIALTIES

Horne Double Acting Brakes
Giant Geared Brakes
Differential Staffless Brakes
Sterling Safety Brakes
Sterling Trolley Bases
Sterling Sand Boxes
Air Rectifiers, eliminating frozen brake piping
Q-P Trolley Catchers
Lord Screenless Air Cleaners for Compressors
Hydrogrounds and Lightning Arresters
Fenders and Wheelguards
Controller Fingers
Friction and Rubber Tape
Packing and Gaskets
Air Hose and Rubber Specialties

Horne Manufacturing Co.
50 Court St., Brooklyn, N. Y.

# You can weld the time-tried EricoBond

in any of these ways to meet your conditions

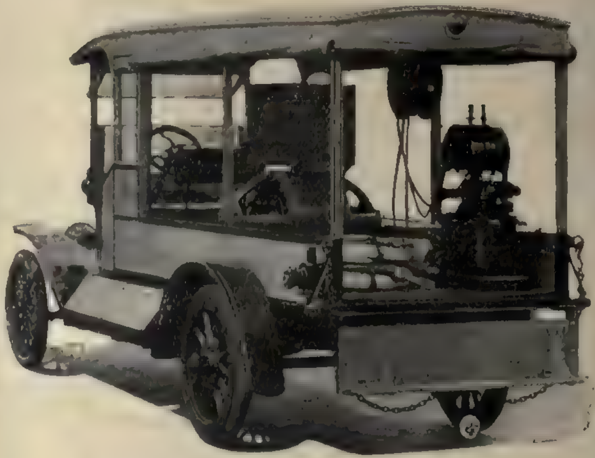


### With the Original Erico Bonding Car

—when the job is big—such as track under construction, on interurban work where the joints to be bonded are scattered or consecutive, or for any job where the cars do not run more frequently than every 15 minutes.

### With the Champion Bonding Truck

—when the job is not on right-of-way, and when car service in city or suburbs is frequent. No part of the apparatus occupies the track or offers the least interference to service.



### With the Erico Portable Welder

—when there is any job to be done where a head type of bond can be used; this apparatus, weighing less than 300 pounds without cart, will be found very efficient and low in first cost.

You can also use the Rheostat of the Erico Portable Welder as an arc welder for general repair work.

ERICO THE LINE OF LEAST RESISTANCE

*No matter which of our welders you use, you get the proved ERICO Bond Reliability*

## The Electric Railway Improvement Co.

Cleveland

# American Steel & Wire Company's Crown Pin Duplex RAIL BONDS

## Used on the HELL GATE Bridge

The American Steel & Wire Company's Crown Pin Duplex Rail bonds installed on the 125 lb. rails spanning the enormous Hell-Gate Bridge and Viaduct of the Pennsylvania Railroad System are well in keeping with the magnitude and permanence of the whole undertaking.

Like the bridge itself, they are made for hard usage and continuous service under severe conditions.

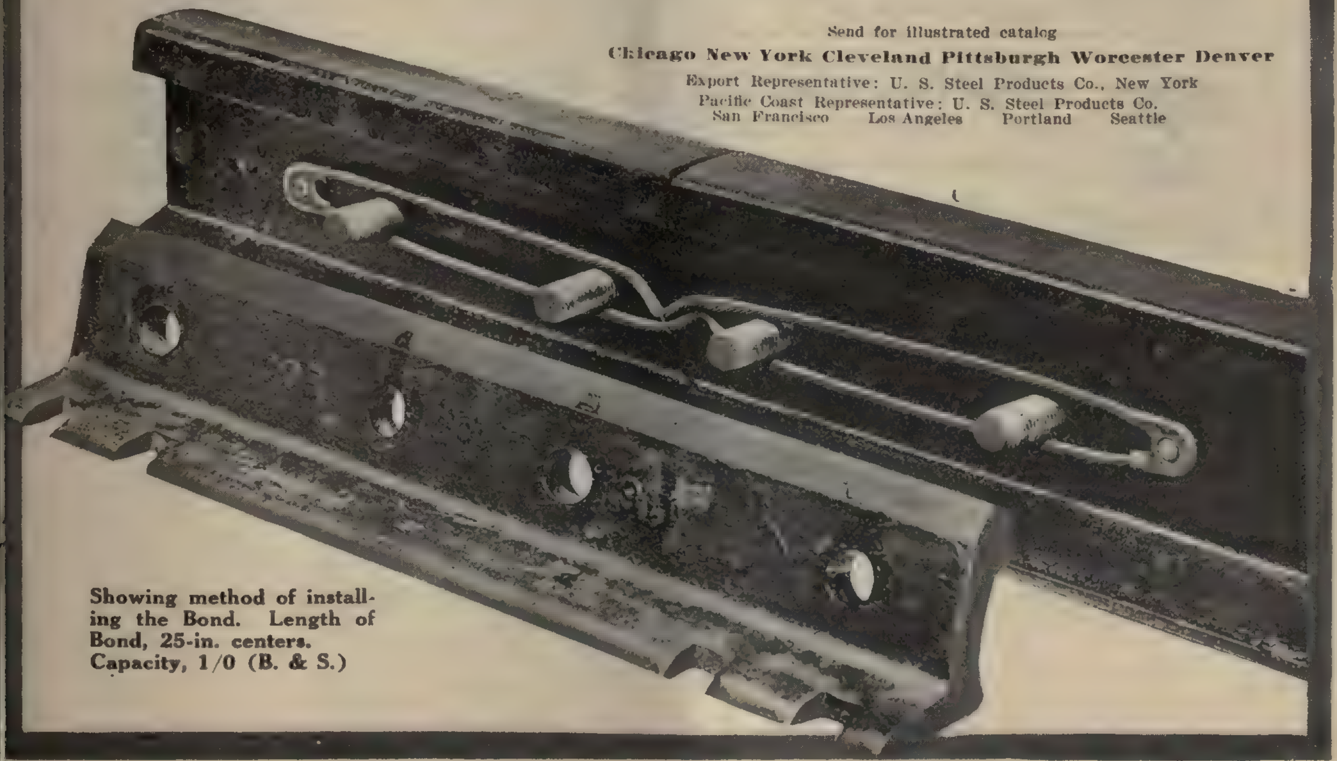
Send for illustrated catalog

**Chicago New York Cleveland Pittsburgh Worcester Denver**

Export Representative: U. S. Steel Products Co., New York

Pacific Coast Representative: U. S. Steel Products Co.

San Francisco Los Angeles Portland Seattle



**Showing method of installing the Bond. Length of Bond, 25-in. centers. Capacity, 1/0 (B. & S.)**

Pouring

MEN OF ACTION

invariably look ahead, then they go ahead, "hammer and tongs," and achieve their present purpose with maximum result.

Just so with "Thermit" welds, which are the acknowledged "maximum result" welds in use today.

Rail that has once been "Thermit" welded is solid, and continuous, for all the time afterward.

No more unnecessary paving expenses or rail joint inspection and maintenance, electrolytic waste checked for good.

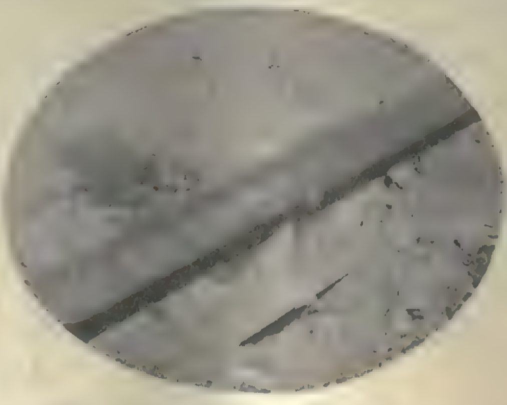
The men of action who weld for permanence have looked ahead and realized the hundredfold return in rail economy obtained for the slight extra outlay of the "Thermit" outfit.

GOLDSCHMIDT THERMIT CO.

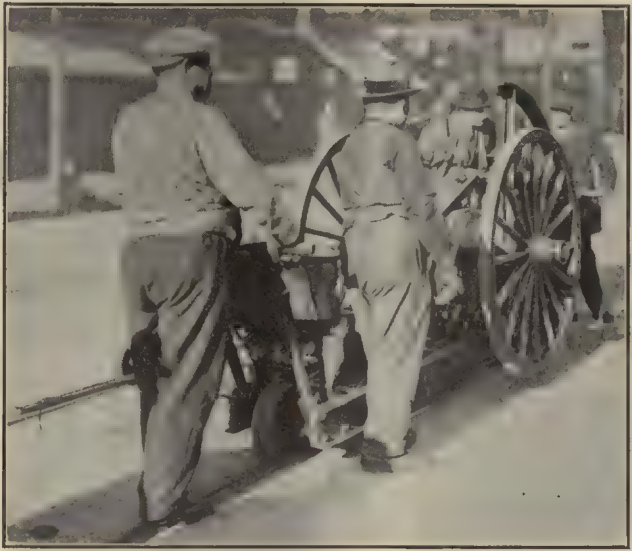
120 BROADWAY, NEW YORK

329-333 Folsom St., San Francisco 103 Richmond St., W., Toronto, Ont.

7300 So. Chicago Ave., Chicago



Thermit Insert Rail Weld Completed



# Catch the Bad Track Spot When It's Young —That's the Best Economy

Cupped joints and corrugations in track are no respectors of youth.

Merely because track is new is no assurance that these bad spots will not quickly develop in it.

Ample experience shows that track which has been laid only a few months is just as apt to require "treatment" as track that has been in service for years.

If you will put the

## Reciprocating Track Grinder

at work when these bad spots in rails **first begin** to make themselves evident you will not only keep your rails in constantly good condition but you will save money in the long run. Because you will find less grinding necessary than if you allow the trouble to go deep and you will not find it necessary to grind away so much of the wearing surface, which is, of course, the life of the rail.

You can determine exactly what a Reciprocating Grinder can do for you at our expense.

Procrastination simply adds to your ultimate expense.

## Railway Track-work Co.

**30th and Walnut Streets, Philadelphia**

# How are people going to know about *your* ability to serve them if you do not tell them about it?

NINETY-EIGHT per cent of all used-equipment advertisements are simply listings of material for sale.

In today's bumper market, the mere cataloging of equipment produces results — but it is hand-to-mouth advertising and will not build up momentum to carry over dead center and impress the man who will be in the market at some future date.

Teach him now to think automatically of YOUR service when he is ready to buy.

The object of good advertising is to impress on the buyers of equipment that they ought to do business with the advertiser. The logical place to impress them is in the

**SEARCHLIGHT SECTION**

**of the McGraw-Hill Engineering Papers**

*Ask us for a suggestion on how to make the most of Searchlight Service*

**McGraw-Hill Publishing Co., Inc.**
**New York**

**Some Searchlight Ads.**

- Agents Wanted
- Agencies Wanted
- Foreign Business Representatives Wanted
- Salesman Wants Position
- Salesman Wanted
- Auction Notices
- Civil Service Opportunities
- Employment Agencies
- Labor Bureaus
- Positions Vacant
- Evening Work Wanted
- Positions Wanted
- Tutoring
- Vacation Work Wanted
- Franchises
- Machine Shops
- New Industries Wanted
- Specialties
- Business Opportunities
- Partner Wanted
- Patents For Sale
- Books and Periodicals
- Buildings For Sale
- Desk Room For Rent
- Desk Room Wanted
- Industrial Sites
- Misc. For Sale
- Plants For Sale
- Property For Sale
- Water Front Property
- Contracts To Be Let
- Contracts Wanted
- Proposals
- Sub-Contracts Wanted
- Work Wanted
- Miscellaneous Wants
- Educational
- For Exchange
- For Rent
- Patent Attorneys

American Machinist
Coal Age
Contractor
Electrical World
Electrical Merchandising
Electric Railway Journal
Engineering and Mining Journal
Engineering News-Record
Metallurgical and Chemical Engineering
Power

# Armed with "ARMCO" Iron Culverts

the Missouri, Kansas and Texas Railway gets perfect culvert service under their track at Durant, Oklahoma.

This particular culvert is 40 feet long and 2 feet in diameter.

The M. K. & T. are well satisfied with Armco Culverts because they're rust-resisting, wear-resisting and strain-resisting.

This is because they're made of the purest iron obtainable—

## "Armco"(American Ingot) Iron

Write the Nearest Manufacturer for full information on Rust-Resisting "Armco" Iron Culverts, Flumes, Siphons, Sheets, Roofing and Formed Products.

**Arkansas, Little Rock**
Dixie Culvert & Metal Co.
**California, Los Angeles**
California Cor. Culvert Co.
**California, West Berkeley**
California Cor. Culvert Co.
**Colorado, Denver**
R. Hardesty Mfg. Co.
**Delaware, Clayton**
Delaware Metal Culvert Co.
**Florida, Jacksonville**
Dixie Culvert & Metal Co.
**Georgia, Atlanta**
Dixie Culvert & Metal Co.
**Illinois, Springfield**
Illinois Corrugated Metal Co.
**Indiana, Crawfordsville**
W. Q. O'Neall Co.
**Iowa, Des Moines**
Iowa Pure Iron Culvert Co.
**Iowa, Independence**
Independence Culvert Co.
**Kansas, Topeka**
The Road Supply & Metal Co.
**Kentucky, Louisville**
Kentucky Culvert Co.
**Louisiana, New Orleans**
Dixie Culvert & Metal Co.
**Maryland, Munsey Bldg., Baltimore**
Wm. M. Baker.
**Massachusetts, Palmer**
New England Metal Cul. Co.
**Michigan, Bark River**
Bark River Bridge & Cul. Co.
**Michigan, Lansing**
Michigan Bridge & Pipe Co.
**Minnesota, Minneapolis**
Lyle Corrugated Culvert Co.
**Minnesota, Lyle**
Lyle Corrugated Culvert Co.
**Missouri, Moberly**
Corrugated Culvert Co.
**Montana, Missoula**
Montana Culvert & Flume Co.
**Nebraska, Lincoln**
Lee-Arnett Co.
**Nebraska, Wahoo**
Nebraska Culvert & Mfg. Co.
**Nevada, Reno**
Nevada Metal Mfg. Co.
**New Hampshire, Nashua**
North-East Metal Culvert Co.
**New Jersey, Flemington**
Pennsylvania Metal Culvert Co.
**New York, Auburn**
Pennsylvania Metal Culvert Co.
**North Dakota, Wahpeton**
Northwestern Sheet & Iron Wks.
**Ohio, Middletown**
The Ohio Corrugated Culvert Co.
American Rolling Mill Co.
**Oklahoma, Shawnee**
Dixie Culvert & Metal Co.
**Oregon, Portland**
Coast Culvert & Flume Co.
**Pennsylvania, Warren**
Pennsylvania Metal Culvert Co.
**South Dakota, Sioux Falls**
Sioux Falls Metal Culvert Co.
**Tennessee, Nashville**
Tennessee Metal Culvert Co.
**Texas, Dallas**
Wyatt Metal Works.
**Texas, El Paso**
Western Metal Mfg. Co.
**Texas, Houston**
Lone Star Culvert Co.
**Utah, Woods Cross**
Utah Corrugated Cul. & Flume Co.
**Virginia, Roanoke**
Virginia Metal Culvert Co.
**Washington, Spokane**
Spokane Cor. Culvert & Tank Co.
**Wisconsin, Eau Claire**
Bark River Bridge & Culvert Co.

**Canada**—Canada Ingot Iron Co., Ltd., Guelph, Sherbrooke, Winnipeg, Calgary

35½"
24"
35½"
34½"
26"
34½"
35"
25"
35"
36"
23"
36"
Seating Plan No 34 Approved
Seating Plan No 89 Approved
Seating Plan No 86 Approved

# The Value of Two Inches in a Car Seat

has received due consideration in

# Hale and Kilburn Designs

Look over these possible seating and aisle plans of the same cars.

Note particularly the variations in the width of the cross-seats and the aisle.

Observe how some aisles have been cramped in order to have a cross seat wide enough for two passengers.

Then consider how much more comfortable the passengers will be if they are seated on up-to-date Hale and Kilburn pressed steel seats which give 2 in. more clear seating room without encroaching upon the aisle.

The use of pressed steel instead of malleable iron and of special shapes originated by Hale and Kilburn saves 2 in. for either the aisle or the seat by

PERMITTING THE SEAT CUSHION TO EXTEND THE FULL LENGTH OF THE BACK.

*Pioneers in Steel Trim for Passenger Cars, including interior finish, steel doors, etc.*

HK WALKOVER COPYRIGHTED

**Hale and Kilburn Co.**

Philadelphia New York Chicago
Washington Atlanta San Francisco

HK WALKOVER COPYRIGHTED

# Yes, Mr. Manager, it's true —

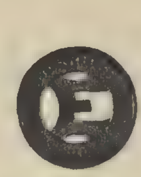
*the problem is solved!* Solved with a completeness and finality that will convince *you*, if you will investigate, fully, frankly, fairly. *Fare-Collecting-and-Accounting has been reduced to a positive, scientific method*, and is handled with absolute mechanical efficiency, by

# JOHNSON METAL TICKETS and the JOHNSON FARE BOX

When *Stone & Webster* and nearly a score of other large operating properties buy *2,700 Johnsons in four months*—when leading railway managements from Manhattan to Frisco, north and south, are equipping their lines with Johnsons—there should be no further question in your mind.

You can adopt JOHNSON METAL TICKETS with the same implicit assurance of efficiency. They have been perfected with the same intimate understanding of practical requirements and the same mechanical exactitude as the Johnson Box itself. And they are coming into wide use by leading railways, notably—

> ***Public Utilities Company, Evansville, Ind.; Mobile Light & Railway Company, Mobile, Ala.; Denver Tramway Company, Denver, Colo.; United Railways Company of St. Louis, St. Louis, Mo.; Milwaukee Electric Railway & Light Company, Racine, Wisconsin.***



Full Size
Metal Ticket

The Johnson System handles all classes of cash fares—nickels, dimes, pennies, and *metal tickets* (two different tokens for full and half fares) *through one hopper*. The box receives the fares direct, the conductor examines but cannot touch them until *after registration*, when they at once become available, the cash for making change, the *tickets for re-sale*.

Errors and disputes are minimized, conductors' accountings are simplified and certified; time required for fare collecting is cut at every stop, and schedules correspondingly improved.

***Satisfying detail on request***

## JOHNSON FARE BOX COMPANY

Jackson Boulevard and Robey St., Chicago
50 East 42nd Street, New York

# The Bonham Traffic Recorder

## Differentiates Your Passengers

Your auditing department is interested not only in the AMOUNT of money and tickets collected, but also in the ACCURATE RECORDING of the fares collected.

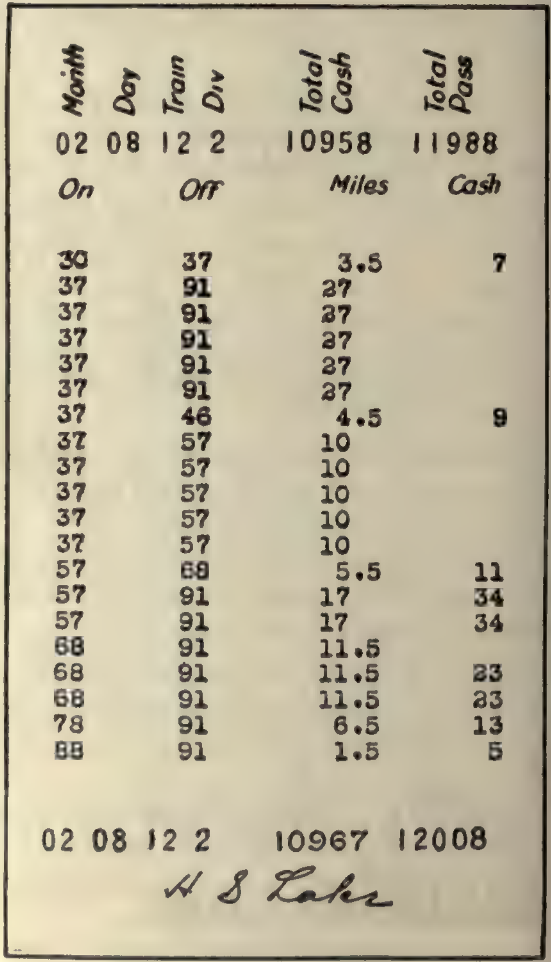
Your transportation department is not only interested in the TOTAL number of passengers, but also in their individual originating and destination points.

### The Bonham Traffic Recorder
### Is Both an Auditing and a Traffic Check

Because it gives you the "on and off" fare and mileage record of every individual passenger, whether that passenger paid cash, ticket, half-fare, pass or an arbitrary fare fixed by local franchise conditions or foreign trackage agreements.

A traffic count, taken at random at any station on your line, will soon prove to you what wonderful control of your earnings is permitted with the Bonham Traffic Recorder, and

ONLY THE BONHAM TRAFFIC RECORDER



| Month | Day | Train | Div | Total Cash | Total Pass |
|---|---|---|---|---|---|
| 02 | 08 | 12 | 2 | 10958 | 11988 |

| On | Off | Miles | Cash |
|---|---|---|---|
| 30 | 37 | 3.5 | 7 |
| 37 | 91 | 27 | |
| 37 | 91 | 27 | |
| 37 | 91 | 27 | |
| 37 | 91 | 27 | |
| 37 | 91 | 27 | |
| 37 | 46 | 4.5 | 9 |
| 37 | 57 | 10 | |
| 37 | 57 | 10 | |
| 37 | 57 | 10 | |
| 37 | 57 | 10 | |
| 37 | 57 | 10 | |
| 57 | 68 | 5.5 | 11 |
| 57 | 91 | 17 | 34 |
| 57 | 91 | 17 | 34 |
| 68 | 91 | 11.5 | |
| 68 | 91 | 11.5 | 23 |
| 68 | 91 | 11.5 | 23 |
| 78 | 91 | 6.5 | 13 |
| 88 | 91 | 1.5 | 5 |

02 08 12 2 10967 12008

H S Lake

### The Bonham Recorder Co.

Hamilton, Ohio

# International *Motor*-driven

## Station Registers to Speed Up

## CARS AT PREPAYMENT AREAS

Where large masses of people gather to board cars, as at big factories, parks and fair grounds, a wonderful increase in track capacity and schedule speed can be obtained by having passengers pay fare before they enter the cars.

A survey of your system may reveal a number of places, particularly at factories, where prepayment areas can be installed in combination with International Motor-Driven Station Registers.

Our exclusive experience in the building of these machines plus the knowledge we have gained from actual operation of installations are all at your service.

*International Devices for Fare Operations on the Car Itself.*

Comprise equipment to meet practically every conceivable method of fare collection, such as—

Single and double car registers, both round and square.

Money counting fare boxes.

Coin and metal ticket counting boxes.

Coin Registers.

Motor driven coin and transfer registers.

Transfer printers, etc.

Also Heeren Enameled Badges.

**The International Register Company**

**15 South Throop Street, Chicago, Ill.**

# Twelve things you would like to have your motormen do

Showing recorder location on one of the cars of the Connecticut Company.

(1) Coast more.
(2) Avoid unnecessary stops and slowdowns.
(3) Release brakes early after stopping on level track.
(4) Save power, brake shoes, and wheel tires.
(5) Start and stop smoothly.
(6) Maintain proper headway.
(7) Avoid running at too high speed.
(8) Guard against rear-end collisions.
(9) Lessen the number of derailments.
(10) Report defects promptly—particularly defective brakes.
(11) Use hand brakes occasionally—enough to keep this safety feature in good working order.
(12) Operate cautiously and safely.

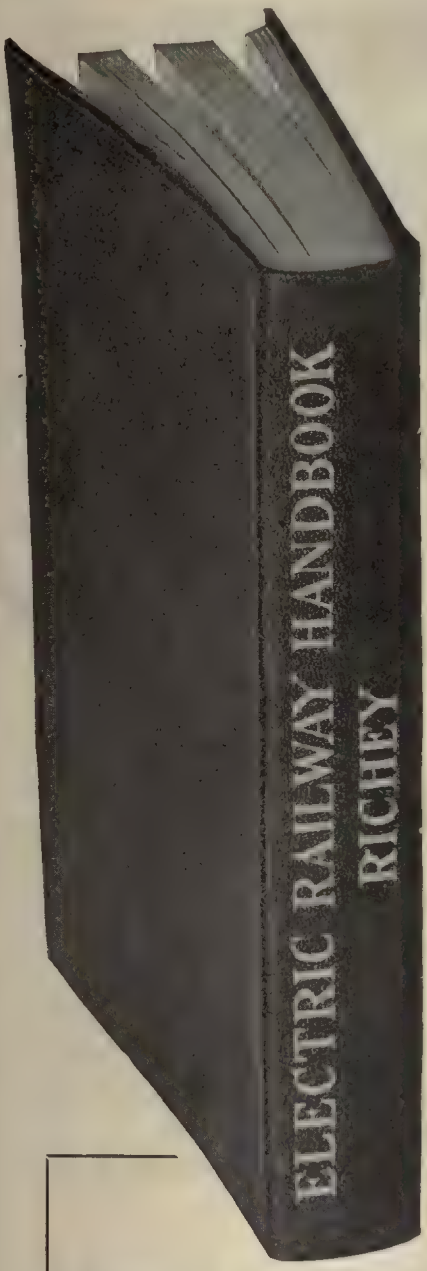
## Equipment of your cars with the

# Arthur Power-Saving Recorder

followed by intelligent interpretation to your men of the meaning of the records established and suggestions for making better records will rapidly educate your motormen to do these things. Big economies and greater safety will result.

**The Arthur Power-Saving Recorder Co.**
**New Haven, Conn.**

*"Power wasted at the brake shoes is the true measure of the motormen's relative efficiency."*



***"It is a great relief to discard my large railway data filing system. I find it contained between the covers of Mr. Richey's Handbook"***

A pocket encyclopedia of practical information for every man in electric railway work.

*Richey's*

**Electric Railway Handbook**

By **Albert S. Richey**, Electric Railway Engineer, Professor of Electric Railway Engineering, Worcester Polytechnic Institute, 832 pages, flexible leather, full-gilt edges, 4 x 7 inches, pocket size, with over 600 illustrations.

*$4.00, (English price 17s) net postpaid.*

And all of this remarkable collection of data is contained in a book that fits the pocket.

There are the contents of five of six ordinary engineering treatises in this pocket volume. The type is legible, the illustrations large enough to be useful, and yet the whole is condensed to a handsome flexible leather volume.

The book takes the place of an elaborate data cabinet.

It supplies complete reference data for the engineer who designs, builds or operates electric railways.

**Send No Money—Just the Coupon**

We will gladly send you this book for free examination—without your incurring the slightest obligation to purchase unless you choose. Simply fill in and mail the coupon. Send no money—nothing but the coupon.

*"Richey's handbook has the least padding, the most practical material for all classes of work of any handbook on any subject with which I am familiar."*

(Signed) **Byron T. Mottinger**
Electrical Engineer,
Fort Dodge, Des Moines
and Southern R. R. Co.

McGRAW-HILL BOOK CO., INC.
239 WEST 39TH STREET, NEW YORK

LONDON: HILL PUBLISHING CO., LTD.
6 & 8 BOUVERIE ST., E.C.

***Publishers of Books for Electric Railway Journal***

**FREE EXAMINATION COUPON**

**McGraw-Hill Book Co., Inc., 239 West 39th St., New York, N. Y.**

You may send me on 10 days' approval:

**Electric Railway Handbook, $4.00 net.**

I agree to pay for the book or return it postpaid within 10 days of receipt.

....I am a regular subscriber to the Electric Railway Journal.
....I am a member of A. I. E. E. or A. E. R. A.

(Signed) ....................................................

(Address) ....................................................

....................................................

Reference ....................................................E S-18-17

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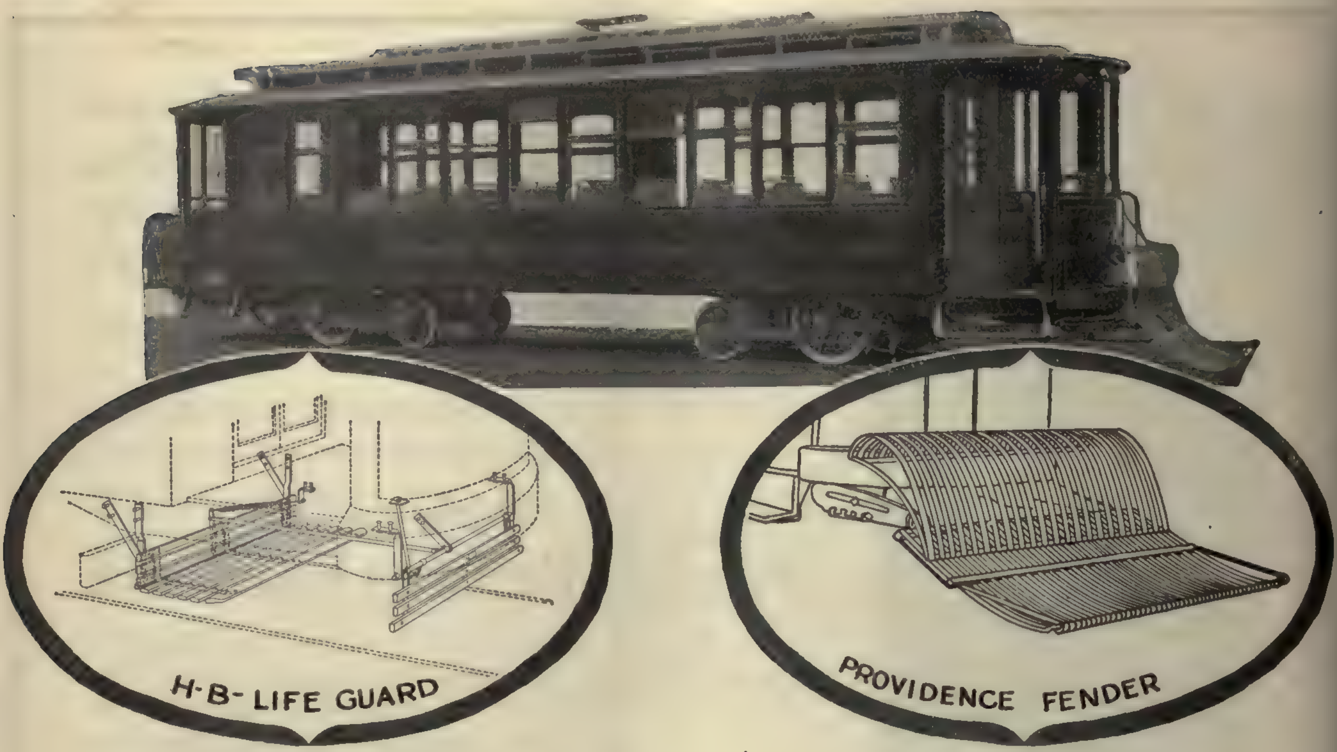

# IS IT the men who make or break the company?

Companies find it policy to **choose** their men for common sense and good driving capability in order to get economical returns.

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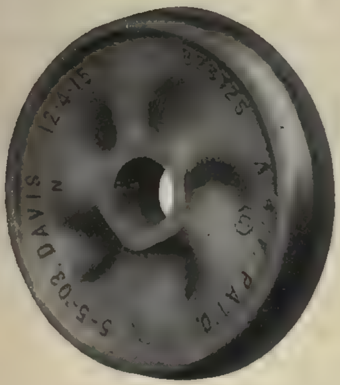

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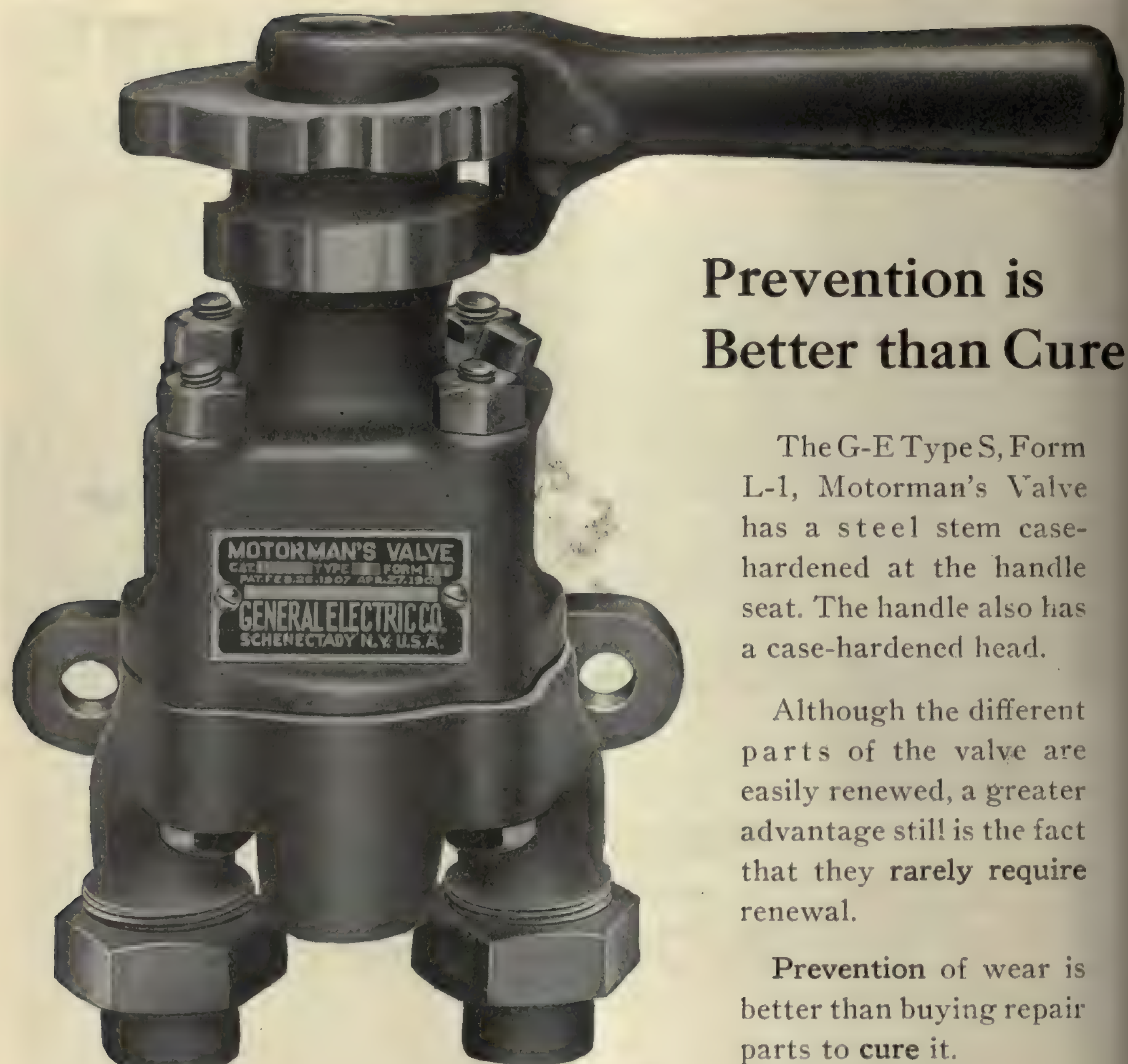

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# Electric Railway Journal

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## Six-Cent Fares and an Association Publicity Bureau

THE campaign of the electric railways for increased fares to meet the rising costs of operation brings up again, and more forcibly than ever before, the need for an active publicity bureau for the American Electric Railway Association. We do not believe, with the author of a recent letter in our correspondence department, that such a bureau would interfere with the work being done for individual companies by privately conducted bureaus or present publicity agents. Rather, it would help them in their work and correlate the efforts being made generally to help the public understand the present electric railway situation. This also is the view, as we understand it, of most of those who have contributed letters on this subject to recent issues of this paper. To make the matter concrete we have asked Ivy L. Lee to summarize the discussion which has been going on in these columns by giving his views as to what such a general bureau could do and how it might conduct its service. Mr. Lee's article appears elsewhere in this issue.

## The Higher-Fare Campaign Must Include the Public

MR. LEE clearly points out that it would be a grave mistake to suppose that it is needful only to convince individual commissioners or legislators of the correctness of the railway point of view. The prime need is to convince the general public. Once that is done, the public's belief will certainly be reflected in the concrete acts of regulative bodies. In the principal electric railway problem before the public to-day—the need of greater revenues to meet the tide of rising costs—there can be no question that in the beginning, at least, public sentiment was adverse to rate advances. The public, however, can be made to see that what is threatened by a fixed 5-cent fare is not only the prosperity of the railways but really the electric railway facilities enjoyed by the public. Once that point is thoroughly understood it will find its reflection in the acts of the commissions. The situation is not peculiar to any one state. The electric railway problem is the same all over the country. The interests of all companies are affected by the wave of sentiment for municipal ownership and operation, which has been made an issue in New York City for the fall campaign. It certainly seems a fitting time to decide whether some real progress cannot be made toward the establishment of a publicity bureau by the American Electric Railway Association. It will never be needed more than now.

## Wooden Cars May Come Back Again

THE condition of the steel market is becoming more tense almost daily. This condition is being felt by the car manufacturers, for their inability to get steel plate and shapes is greatly delaying the delivery of cars on order. At the same time that this condition prevails in the steel market, there is a plentiful supply of wood which might be used for the purpose. The drive in the industry for the use of lighter weight and more durable cars has so accustomed the railway men to thinking only of steel when new cars were under consideration that the tendency is to neglect the possibilities of wood altogether. Perhaps, however, the fact that an emergency exists which makes it practically impossible to get steel plate, and consequently steel car deliveries within a very long delivery period, may serve to deflect attention to cars of wooden construction. They cannot be built as light as steel cars, but, in the event that a company is badly in need of additional rolling stock, there are advantages in reverting for the time being to cars of wooden construction. The steel car will cost less per mile for current to propel it, during all the years it is in service, but for the immediate present a wooden car which could be delivered comparatively very promptly could be earning a substantial revenue during the ten to eighteen months or more that it might be necessary to wait for its steel likeness. The use of wooden cars under these circumstances may be well worth consideration by those companies which are facing abnormal possibilities for increased business without adequate equipment to secure it.

## Keep Up Versus Pick Up in Maintenance Work

FOR the purpose of emphasis we wish to reiterate the line of thought which ran through the articles by S. L. Foster and P. Ney Wilson appearing in the issue of the JOURNAL for Aug. 4. It seems trite to say that prevention is better than cure, for there is no argument possible. But assenting to this axiom is one thing and acting upon it is another. The present condition of the track, line and rolling stock on some properties indicates that maintenance work is not keeping pace with deterioration and that a day of reckoning is ahead. The writer remembers that on one property in particular there was some years ago a regular epidemic of trolley wire breaks. As Mr. Foster says, "When a trolley wire breaks the whole system of interdependent elements of operation is paralyzed." The service interruptions in such cases cost more than adequate maintenance would have done. The evil effects on a patron's mind of a series of service interruptions, such as those which were the necessary result of the epidemic of overhead troubles referred to, last much longer than the trouble itself. He feels that such a condition reflects carelessness in many ways besides that shown in the particular breakdown. Mr. Wilson points out that "way engineers delight in construction work, but the steady grind of track maintenance is not so pleasant." The same is true, of course, with regard to equipment and line work. No routine work is inherently pleasant, except as it is considered a part of the thorough performance of duty.

## Interpretation of Cost Data on Special Work Reconstruction

SINCE the publication of the first installment of the cost data on special work renewals in the Equipment and Maintenance section of this paper a reader has suggested that further details, such as the proper size of repair gang and the number of man-hours and amount of supervision on each job, would enhance the value of the tables. It is undoubtedly true that data of this kind could be elaborated greatly with some profit to the user, but the problem is to give the results of experience in the form most likely to be useful. The compiler of the tables felt that by averaging the costs over a long period the incidental variations would eliminate themselves in the process. The different special conditions of each job thus tend to neutralize each other, giving a figure comparable with the average cost of work done on other properties.

As an example of the difficulty of going into much detail it may be said that the proper size of track gang for a given job has been studied for many years by the Brooklyn Rapid Transit Company and still no definite figure can be given. Many variables, such as width of street, traffic, number of other jobs being done, labor market, season of the year, weather, characteristics of foreman, and special reasons for speeding up the work affect the size of the gang so that it has not been found practical to work out a proper size of gang for each variable or combination of variables. It may be of interest to note, however, that the average track gang on this system contains about twenty-five men including one foreman. As stated in the explanation accompanying the cost figures, these are based on track labor at 20 cents per hour. The foreman's wages, which would not raise the average wages of the rest of the gang more than 1 or 2 per cent, are included in this figure. The number of man-hours can, therefore, be calculated for each job by dividing the cost as given by 20 cents.

The whole subject of cost data is a difficult one to handle on account of the number of variables involved. As has been emphasized to these columns from time to time it is difficult to make comparisons of data from different properties, particularly with reference to track maintenance costs. As pointed out editorially in our issue for July 21, 1917, the chief value of such data is to encourage close study of local unit costs with a view to justifying expenditure or impelling toward economy.

## Tell Your Local Civic Bodies All About Your Troubles

ALTHOUGH we have published some very good examples of higher-fare publicity issued by different companies recently, we believe that as a whole the electric railway companies which are seeking more income are not doing enough talking about it. By this we mean that they are not doing enough in the way of formal talks, given for the enlightenment of public opinion.

In each city where increases of income are sought it is most desirable that a responsible representative of the company, the higher in rank the better, should seek an opportunity to talk about the situation to the local Chamber of Commerce, to the Rotary Club, to the Common Council, to the leading labor organization or in a public forum, etc., and he should see that copies of his remarks are prepared for the press. This sort of publicity work has the true home-made quality and can be most useful in establishing a sympathetic understanding of the business aspects of the situation as the first step toward getting helpful expression of public opinion. The electric railway man wants the public to realize that the service given to the public will suffer if the utility company income isn't sufficient to meet the increased costs of giving service.

A simple, direct, business-like talk, such as any intelligent electric railway manager would make in a friendly chat with a business friend, is exactly the kind of talk that is most useful and most needed. Hifaluting oratory is not the thing. A public that is asked to pay higher fares wants the company and its spokesman to get down to brass tacks. So the talk should be simple, direct and plain. The following outline of points may be helpful.

First—Express your desire to have the public know all the facts, in the belief that they will give you a fair judgment and a square deal.

Second—Show how (with fares fixed) electric railway costs have risen. Show that it takes nearly twice as many nickels to buy electric railway supplies now as it did three years ago, while the fare has not increased.

Cite a dozen or more important items, such as coal, lumber, oil, steel, iron, copper and the like.

Having driven that point home, show the crisis that this fixed fare and rising costs have produced. The average man doesn't care a rap about your troubles. The next thing is to show him that this crisis means trouble for him.

If their investment in electric railways doesn't pay—and it doesn't under present conditions—investors will drop it to go into other things. And this will mean disaster. Disregarding the disaster to the company, either in the form of receivership or anything else, a lack of a constant supply of investment support means some very real and concrete discomforts to the public. A prosperous utility company can give good service, build new lines, put on new and better cars, put in better roadbed, better heating and lighting, keep its cars clean, etc. But the alternative is—

1. That you'll have to give car service on a headway of ten minutes instead of five minutes.

2. That the cars will be crowded.

3. That rails and roadbed will be like the rocky road to Dublin.

4. That cars will be dirty.

5. That new sections of the city will have to go without new car lines.

It was to insure good service and to insure its being kept up that the law declares that investors are entitled to a fair return on their investment. Their companies can prove that they are not getting this fair return. Under the public service law the electric railway companies are not allowed to make big profits, but they can't give service at all without some profit.

After all, there's no occasion for ill feeling or denunciation or any other sentimental outburst in the case. It's a simple matter of the public and the public service commissioners knowing the exact business facts as to the situation with each separate company and of making a ruling accordingly.

And good, homely talks to influential civic bodies along these lines cannot help being useful. For the public good-will is absolutely essential. To get a verdict from the public service commission alone is not enough. The public does not have to accept that as final. It can go back to the legislature.

## Neglected Positive Stops— An Insidious Operating Evil

IN an article by John A. Beeler published on another page of this issue attention is called to a feature of electric railway operation that, so far as we know, has been absolutely overlooked heretofore. This is the neglect of what Mr. Beeler terms the "positive stop," by which is meant a stop made by cars at a certain point for arbitrary reasons and not to pick up or discharge passengers. That failure to keep track of such stops as these may constitute an appreciable handicap to efficient operation is almost obvious. Nothing is easier to establish than such a stop, and after it has once been established, nobody is particularly concerned to bring about its elimination, with the result that train crews—who are always influenced strongly by tradition—may keep on making the stop for years, even though the reason for its establishment has been forgotten and long since ceased to apply.

In the past on many electric railways all kinds of positive stops have been introduced with reckless abandon. Stops have been established during progress of track reconstruction, or bridge work, or other temporary interferences, and after the completion of the work apparently no one thinks of removing the stop order. Some stops even mark the place of accidents that have happened in the distant past, while others indicate the stores or residences of people who have or have had "pull."

On a road with 100 cars a total of 5,000,000 such positive stops might well be made annually, and, judging from such data as are available, it is easily conceivable that 200,000 of them might be absolutely unnecessary. The cost of power and wear and tear for each of these may be set at 0.5 cent, giving a total possible saving of $1,000 per year, to say nothing of the savings due to faster schedule speed in case the situation of the eliminated stops permitted actual incorporation in the schedules of the time that was saved. In short, this matter is one that should be promptly looked into by every electric railway to the end that needless stops may be eliminated.

## Electric Railways and Power Generation

IN last week's issue of the JOURNAL there appeared two tables showing approximately the situation regarding the generation, purchase and sale of power by electric railway companies as it existed about a year ago. The data were based upon the August, 1916, edition of the *McGraw Electric Railway Directory*, the latest source of information available when the compilation was undertaken. The figures given are not to be analyzed too closely, as no hard and fast line can be drawn which will divide the purchasing and the generating railways, but the data will serve as a general guide. The percentage of generating companies shown is slightly higher than that given in the latest report of the United States Bureau of the Census, but the small difference could easily be due to the manner in which the companies forming groups or syndicates are listed in the two compilations. Roughly speaking from 50 to 55 per cent in number of the railway companies are still generating power. That this group includes many large ones is evident from the fact that about two-thirds of the mileage and of the cars are operated on power so generated.

A study of the situation by states as disclosed by the tables is interesting but is significant only in connection with an analysis of the local power plant conditions. When the power business as such is highly developed, the central station naturally captures a good share of the railway business, because it can offer attractive prices. The railway load improves its load factor and, as was clearly explained by the late H. G. Stott in a paper abstracted in the issue of the ELECTRIC RAILWAY JOURNAL for June 24, 1916, page 1170, the question of purchasing versus generating power comes down ultimately to that of load factor. If a railway load can be taken on by a central station without an increase in equipment cost and operating expense equal to that which would have been incurred by the railway in meeting its own requirements, then the question answers itself.

The advance in the art of power generation has been recently so rapid that plants built only a few years ago are greatly handicapped in competition with those more nearly up to date. The central stations have the greater incentive to modernize their equipment because the cost of power is everything to them. In the case of the railways, while power is a considerable element in operating cost it is not the most important one. The power department may not always, therefore, obtain the support which it needs. Constant modernizing of its equipment, however, will enable it to make a continuously creditable showing.

# Railway Stops

## The Author Analyzes the Effect of Stop Frequency on Schedules and on Walking Distances and Time Savings for Patrons—Recommendations Are Made for Minimum Stop Spacings and for Methods to Reduce the Number of Stops

By JOHN A. BEELER
Consulting Engineer, New York City

ON a railway there will usually be found two reasons for making stops, the first and essential one being to take on or discharge passengers or freight, and the second being to hold the car because of some operating conditions, such as the requirements of safety. Stops which fall in the latter classification are necessary in connection with the movement of any train over the tracks, and they may therefore be termed "positive stops." On steam railroads and interurban railways operating entirely on private right-of-way stops of this character need be but very few. On street railways, however, a number of positive stops are considered necessary, in general, because of (1) steam railroad crossings and drawbridges; (2) street railway crossings; (3) fire stations and dangerous highway crossings; (4) signals, where hand-thrown, and (5) terminals.

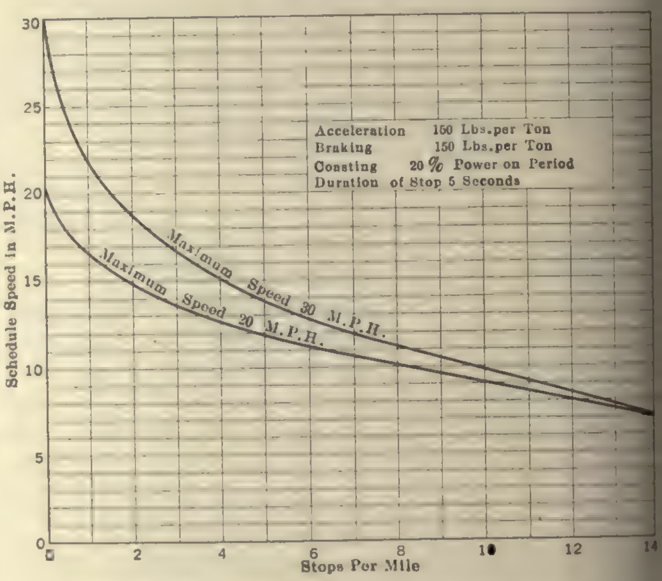
Train stops that are of importance to the public are those for receiving and discharging passengers. At first sight it might appear that cars should stop at any point for this purpose, but this has been found to be impracticable. The earliest steam trains and the horse cars followed the practice, but it was soon abandoned, and definite stopping places were substituted. With the steam railroads this innovation came early in the nineteenth century, but with street railways it was not until the advent of electric traction that any attention was given to the subject.

### EFFECT OF STOPS ON SCHEDULE SPEED

The far-reaching effect of such stops, not only on schedules, but on the possibilities of service, are not understood by the average trainman. The number of stops has a very definite bearing on the schedules that may be maintained with a given equipment, and as the stops are more frequent the slower is the possible schedule.

As a concrete illustration, consider a car with an average running speed of 20 m.p.h. Without stops it will, of course, travel a distance of 1 mile in three minutes. Require it to make eight stops within the mile, and it will make but 10 m.p.h., involving a running time of six minutes. In the case of an interurban car with an average free running speed of 30 m.p.h. a mile may be made without stops in two minutes. Let the car make but four stops in a mile, and the schedule is reduced to 15 m.p.h., requiring four minutes to the mile. As an example of this effect of stops upon schedule speed, the accompanying curves show graphically the result with cars operating at maximum speeds of 20 m.p.h. and 30 m.p.h. respectively.

A great variation in the number of stops exists on different lines. No general standard practice seems to exist in the location of stopping places, this being especially true of city electric railway systems. In most cities throughout the country the distance between stops is determined by the length of blocks, and little or no consideration is given to the operating conditions or to the benefits to be derived from more rapid transit. The length of block in different communities, or sometimes in different sections of the same community, varies greatly. In New York, for instance, the blocks are twenty per mile on the north-and-south streets, while on the cross streets in the same part of the city they are only 5.6 to the mile, or 960 ft. in length.



RAILWAY STOPS—EFFECT OF STOPS ON SCHEDULE SPEED

Since a considerable time is required for a car to start from rest and to get up to full speed, it is evident that when the blocks are short the car cannot attain its full speed between blocks. This tends to produce inefficient operation and slow schedules. The difficulty resulting from the "stop-at-every-block" policy has resulted in agitation everywhere throughout the country for the adoption of better methods of locating stopping places.

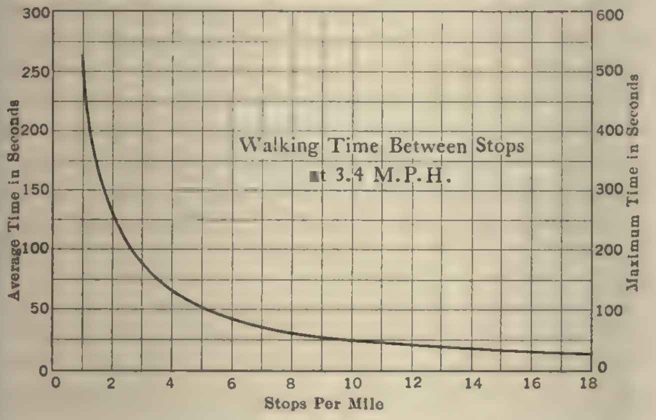
Unless the public is willing to sacrifice all the benefits ensuing from rapid transit, it is evident that not every intersecting street can be made a stopping place regardless of the length of the block.

### WALKING DISTANCES

For the patron, the immediate effect of a change in stopping places is a change in the distance he must walk from his destination in order to board the car. Obviously, the maximum distance a person has to walk on account of the location of stopping places is equivalent to one-half the space between two consecutive stops.

The average walking distance is but one-quarter of this space. To the walking distance must be added the walk from the destination to the railway route, which has to be made regardless of stop spacing. In some cases a change in the location of stopping places may only make a readjustment of the route to be walked rather than an increase in the distance to be covered.

If it is assumed that the average walking rate in residence districts, where there is no street congestion, is 3.4 m.p.h., the time required to walk the maximum and average distances due to the spacing of stopping points is as set forth graphically in the accompanying curve. From this it may be seen that, with stops spaced eight per mile, the maximum walk for a patron requires 1.1 minutes. With fourteen stops per mile 0.6 minute is required, or a difference of only about 0.5 minute from that required with the stops at intervals of eight per mile.



RAILWAY STOPS—AVERAGE WALKING TIME FOR PATRONS WITH VARYING NUMBER OF DESIGNATED STOPS PER MILE

The increase in walking time as above outlined is, however, much less than the time that is saved through increased schedule speed. By way of illustration of this, Table I has been prepared. This shows the comparative time required for a passenger to be transported for a distance of 2 miles in city service under conditions respectively involving fourteen stops and eight stops per mile. The time necessary to walk the average distance at each end of the trip is also included on account of the respective spacing of the stopping points. The results show that the passenger actually saves 4.7 minutes in time by walking, on the average, an additional distance of 71 ft. at each end.

Similarly, Table II shows the time required for a 10-mile trip in an interurban car under conditions respectively involving ten stops and four stops per mile. The free running speed is 30 m.p.h. in each case. This shows that a saving in time of nearly twenty minutes is made on a one-way trip by making an average additional walk of less than 200 ft. at each end of the trip. In the event that the maximum walk is necessary for any patron, this is less than two-thirds of the maximum walk required by the rapid transit lines in the great cities of the world.

### NECESSITY FOR CONTROL OF STOPS

The necessity for a basis for controlling the frequency of stopping points may be illustrated in another way: It has already been shown that a car in city service making a maximum speed of 20 m.p.h. loses one-half of its schedule time when making eight stops per mile. This gives the car only forty-five seconds between stops. Likewise, an interurban car with a maximum speed of 30 m.p.h. is capable of making a schedule speed of only 15 m.p.h., when required to make four stops per mile, thus also losing one-half the time on account of stops, and giving the car only one minute between adjacent stops. Therefore, if the electric railways are going to give the public more service by means of faster schedules, the spacing of stopping points must be controlled.

As previously stated, there is no standard practice for locating stopping points, the length of block generally being the determining factor. In several American cities there has been adopted the so-called skip-stop plan, by which stops have been made at alternate streets. The most notable progress along this line in any American city has been made in Cleveland, Ohio. Under the direction of Peter Witt, former traffic commissioner, a standard has been adopted of an average of about five designated stops per mile. The plan in that city has proved that this spacing is very satisfactory, both to the public and to the company.

In some cities results have been obtained by operating cars during rush hours on the "limited-stop plan," cars being run from the downtown terminal for considerable distances without making stops to discharge passengers, although passengers will be picked up at any regular stopping point. In some other cities express service is given, the express cars stopping only at certain designated places. In Pittsburgh this has been extended so that some of the important trunk lines are given over to express service at all times.

In the largest cities of the world rapid transit is dependent largely on lines constructed on private right-of-way either above or below the street level. With this exclusive right-of-way it becomes possible to regulate the number of passenger stops to meet the real demands of the service, and the infrequency of stopping places is one of the most essential factors in the successful operation of such railways. The average distances between stopping places on elevated and subway lines in the different large cities are shown in Table III on page 260, the general average for all these lines being two and one-half stops per mile.

In each of the cases cited all local passenger stations are included. In some cities, however, there are express trains which do not stop at all of the stations, and in a few cases, such as New York City, a portion of the track is given over entirely to express service. In the

TABLE I.—PASSENGERS' TIME AS AFFECTED BY STOP SPACING

City service; 2-mile car trip.

| | | |
|---|---|---|
| Number of stops per mile | 14 | 8 |
| Free running speed of car—m.p.h | 20 | 20 |
| Schedule speed making all stops | 7 | 10 |
| Minutes required to ride | 17.1 | 12.0 |
| Minutes to walk average distance each end of trip | 0.7 | 1.1 |
| Total minutes required | 17.8 | 13.1 |
| Minutes saved by passenger | .. | 4.7 |
| Average walking distance at each end, in feet | 94 | 165 |

TABLE II.—PASSENGER TIME AS AFFECTED BY STOP SPACING

Interurban service; 10-mile car trip

| | | |
|---|---|---|
| Number of stops per mile | 10 | 4 |
| Free running speed of car—m.p.h | 30 | 30 |
| Schedule speed making all stops | 9.8 | 15.0 |
| Minutes required to ride | 61.2 | 40.0 |
| Minutes required to walk average distance each end of trip | 0.9 | 2.2 |
| Total minutes required | 62.1 | 42.2 |
| Minutes saved by passenger | .. | 19.9 |
| Average walking distance each end, in feet | 132 | 330 |

TABLE III.—FREQUENCY OF STOPPING PLACES ON ELEVATED AND SUBWAY LINES

| City | Distance Between Stops | | Average Number of Stations Per Mile |
|---|---|---|---|
| | Feet | Miles | |
| New York | 1,991 | 0.378 | 2.65 |
| Chicago | 1,820 | 0.345 | 2.90 |
| Boston | 2,600 | 0.493 | 2.03 |
| London | 3,100 | 0.586 | 1.70 |
| Paris | 1,632 | 0.309 | 3.24 |
| Berlin | 3,200 | 0.606 | 1.65 |
| Average | 2,112 | 0.400 | 2.50 |

TABLE IV.—FREQUENCY OF STOPPING PLACES ON INTERURBAN LINES

| Line | Distance Average Between Stops | | Average ber Num- Stops Per Mile |
|---|---|---|---|
| | Feet | Miles | |
| Portland & Lewiston Interurban Ry | 7,392 | 1.40 | 0.7 |
| Boston & Worcester Ry | 1,742 | 0.33 | 3.0 |
| Providence-Fall River Ry | 4,435 | 0.84 | 1.2 |
| Buffalo, Lockport & Rochester Ry | 5,480 | 1.04 | 1.0 |
| Cleveland, Alliance & Mahoning Valley Ry | 4,400 | 0.83 | 1.2 |
| Twin City Rapid Transit Co | 4,805 | 0.91 | 1.1 |
| Stark Electric Railway | 2,716 | 0.51 | 1.9 |
| Galveston-Houston Electric Ry | 19,008 | 3.60 | 0.3 |
| Denver & Northwestern Electric Ry | 2,382 | 0.45 | 2.3 |
| Denver & Intermountain R. R | 1,951 | 0.37 | 2.7 |
| Grand Junction & Grand Valley Electric Ry | 3,484 | 0.66 | 1.5 |
| Salt Lake & Utah Railway | 10,085 | 1.91 | 0.5 |
| Central California Traction Co | 4,600 | 0.87 | 1.2 |

table the figures represent the maximum number of local stops. The demand of the public for real rapid transit is well shown by the fact that these lines are much more popular than the surface lines operating over practically the same route. This demonstrates that the public does not consider it any great hardship to walk considerable distances, and even to climb stairs in addition, provided the service obtained is worth the effort.

### STOPS ON SUBURBAN SERVICE

It is frequently difficult to distinguish the difference between interurban and suburban railways. Some are on highways, while others are built on private right-of-way. Often the suburban territory is difficult to distinguish from the city territory, and sometimes the stopping places are as frequent along public highways as on the city streets. A minimum number of stopping places is therefore obtained on high-speed lines built on private right-of-way. Such roads approach, to a great extent, steam railroad practice. The frequency of passenger stops on a number of representative interurban railways is shown in Table IV.

In the early days the importance of the stop question was more fully realized by the steam railroads than by electric lines. Such roads give service with local trains that is of the same character as that performed by the high-grade electric interurban lines. This is also true in suburban territory. The extensive business of this character handled by the steam railroads in the vicinity of Boston, for example, permits them to establish stations approximately 1 mile apart. All of these steam railroads give express service in addition to their local service, and a large number of the patrons commonly wait for the express trains on account of the shorter running time. Nevertheless, analysis makes it evident that the reduced running time of the express trains is attained by reducing the number of stops to a minimum and not by an increase in maximum train speed.

The latest and most formidable competitor of the street railway is the passenger automobile. This operates over the street at a high rate of speed and makes few or no intermediate stops. Thus it has a great advantage, and nearly everyone who can afford it prefers this method of transportation, largely because of its time-saving qualities. Nevertheless good street car service is the cheapest, safest and most comfortable method of transportation for urban and suburban communities, although it has not made the advance during recent years in this respect that could have been expected. As a starter in this direction, there is no one item more important than the reasonable elimination of stops.

### REDUCTION AND LOCATION OF STOPS

Toward this end it may be said that the saving of a positive stop, as opposed to a passenger stop, is of much greater value. In no way can the elimination of a positive stop be said to discommode the patron. On the average railway many positive stops can be eliminated without sacrificing anything in the way of safety, and in other cases the loss of time at the necessary positive stops can be reduced. These results may be accomplished as follows:

At steam railroad crossings the car should be stopped if required by law, but the flagman on duty can in most cases give the proceed signal and save considerable time. This will eliminate the necessity of conductors leaving their cars. Automatic stops can be used to set the brakes at drawbridges when the span is opened or when not properly closed. Also, electric switches can be employed at all important stopping points. Cars on the main line should always be given the right-of-way at crossings and junctions, while warning signs can be placed on highways at approaches to the tracks and at blind alleys and the like.

Signals might well be used at fire stations when an alarm is given, and automatic signals should be generally substituted for hand-operated signals on all important lines, more automatic signals being installed on single tracks. In some cases double track can be substituted for single track to good advantage merely because of the opportunity to eliminate positive stops.

With regard to the location of passenger stops it may be said in general that stopping points should be established at intersecting streets or crossroads, but not necessarily at every such intersecting street. So far as possible stopping points should be spaced at equal intervals and where they will best accommodate patrons. Where a fixed stop is necessary it should, if possible, be made a passenger stopping place also, thus eliminating one stop.

Stops should not be made on single track if in close proximity to double track or sidings where one car may delay another. Stops should be made only where other cars may be clear in passing and not on switches, curves or crossings.

In all cases the track space where passengers should stand ought to be plainly indicated at each stopping point. This location should be opposite the car entrance and not across the intersecting street, nor even 15 ft. away, because one second is lost for each 5 ft. that has to be walked by the passenger after the car stops.

Conditions in each city naturally prevent the establishment of any general rule for universal application. However, as a minimum basis for determining the spacing of passenger stops, it may be said that in thinly populated territories an average of eight stops per mile (spacing of 660 ft.) is a reasonable figure.

The minimum spacing for the congested business districts may be set at ten stops per mile (spacing of 528 ft.).

In the residential sections of cities and in suburban districts a figure ranging between eight stops and five stops per mile (spacing of 660 ft. to 1056 ft.) may be used, the greater spacing being adopted as frequently as practicable.

In suburban districts the closest spacing allowable where any semblance of interurban service is to be maintained is four stops per mile (spacing of 1320 ft.).

The spacings above have been recommended as reasonable for the various kinds of territory stated and are placed far enough apart to allow maintaining reasonable schedules. It is not believed that there is any necessity of using closer spacing of stopping places except under unusual conditions. With the adoption of such spacing of course the probability of making every stop is increased. However, the fact that the car will not stop at intermediate points is of greater value in making up time-tables than the possibility of passing a stopping place when traffic is not heavy, because the time-table department cannot count on any definite number of stops in the more congested portions but must make the running time or the lay-over sufficient to allow for at least a large portion of the stops being made on each trip. The elimination of unnecessary stopping places is probably the most important move that can be made toward improving schedules, whether for congested street traffic or interurban lines.

## Another Increase for Massachusetts

### Commission Allows Milford & Uxbridge Street Railway to Increase Fare Unit to Six Cents and Raise Workmen's Rate

A GENERAL increase in the fare unit from 5 to 6 cents, and the substitution of morning and evening workmen's strip tickets at twenty for $1 for existing reduced rate tickets, were sanctioned by the Massachusetts Public Service Commission on Aug. 9 for the Milford & Uxbridge Street Railway. The company's petition was filed on May 5, 1917. The commission suspended the operation of the new schedule, proposed for June 4, until Aug. 10.

The main line of the Milford & Uxbridge is 20 miles long, extending from Framingham depot through Holliston, Milford and Hopedale to Uxbridge, with a branch from Milford to Medway, 7.5 miles, and from Milford to Hopkinton, 6.5 miles. Between Framingham and Milford the road is paralleled by the Boston & Albany Railroad, and other parts of the line compete directly with steam railroads. Milford and Framingham together have a population of about 30,000. The remainder of the territory is thinly settled.

In addition to the above owned lines, the company operates under lease the Medway & Dedham Street Railway, about 20 miles long, and provides cars, crews and power for the Grafton & Upton Railroad, 15 miles. No increases were proposed for the leased lines, on which the present 5-cent rate amounts to about 2 cents per mile.

The outstanding capitalization of the Milford & Uxbridge Street Railway on Jan. 1, 1917, was: common stock, $440,000; preferred stock, $100,000; bonds, $500,000, and notes payable, $53,500; total $1,093,500. The permanent property investment is about $32,500 per mile, which the commission holds to be reasonable. About two-thirds of the floating indebtedness represents property improvements and additions or replacements.

Dividends on common stock for the last fifteen years have averaged about 3 per cent. Regular 6 per cent dividends have been paid on the preferred stock since 1912. This, however, does not fully indicate the return received by security holders. In 1907 the Milford Investment Company was organized and took over most of the company's floating debt, amounting between 1907 and 1910 to an average of about $185,000. This was finally paid off by issues of preferred stock. During much of the time the interest paid to the investment company was 9 per cent; the remainder of the time, 7 per cent.

The net income of the company last year was $28,811, substantially the same as for 1915, but considerably less than for 1910-1911, 1911-1912 and 1914-1915. For the first five months of 1917 the operating income of the owned lines fell short $1,840 of expenses and fixed charges. For the same period of 1916 there was an excess of $3,955. Moreover, during the last ten years power was sold to the central station in Milford at a profit of about $7,500 a year but now this revenue is cut in half and will disappear in December. Steam railroad competition has been a severe handicap, and the company has been hit by the present high cost of materials.

The commission's inspection department found the physical property, as a whole, well maintained. In fixing the amount which ought to be set aside for depreciation, the company set the following percentages: Rails, 3 per cent; power stations and equipment, 4 per cent; rolling stock, 2.5 per cent; buildings, 2.5 per cent, these being applied to the book value of the several properties. The company stated that it never had been able to set aside a sufficient amount for depreciation. On Dec. 31, 1916, the accumulated total was only $7,299, when it should have been $255,000.

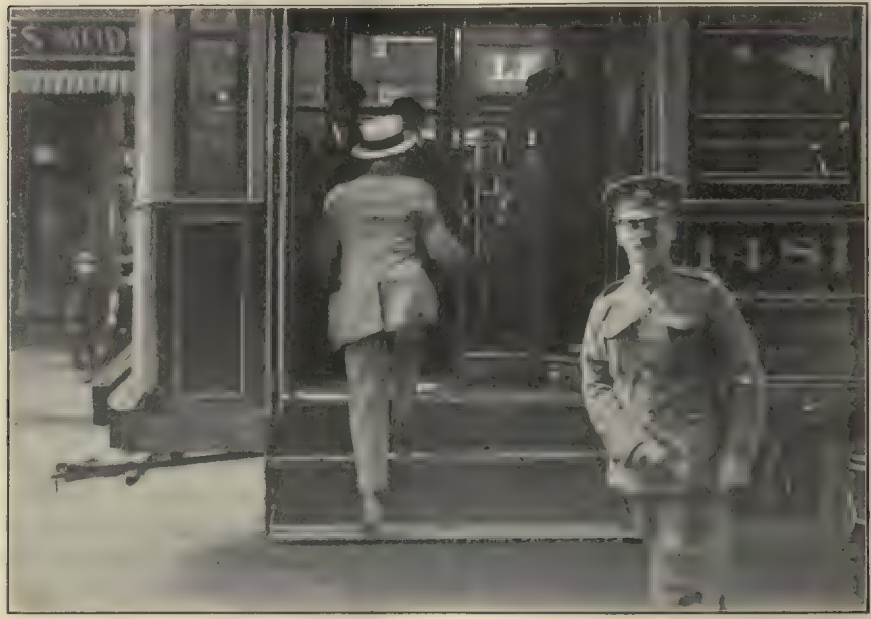
The company estimates that the new rates will yield $45,042 added revenue a year, at the maximum, but that it may not exceed $31,000. The former estimate is based on the assumption that riding will not decrease, while the latter is based on a 15 per cent decrease deduced from the experience of other roads making like unit increases. The commission says it is usually less, rather than more than 15 per cent. The increase, it is said, should be sufficient to provide annually for 6 per cent dividends and $15,000 added depreciation.

## Act to Control Trespassing Passed in Connecticut

For many years Connecticut has been among those States in the country that have not by law attempted to prevent the unnecessary waste of life due to trespassing upon railway right-of-way. The Connecticut Legislature has recently passed, however, and Governor Holcomb has just signed, a bill that should do much to eliminate the evil in that State. The bill is an amendment to Chapter 202 of the public acts of 1905. A fine or imprisonment, or both, are provided for violation of the provisions of the act.

# Montreal Adopts Air-Operated Doors and Steps

### The Montreal Tramways, Pioneer in Prepayment, Has Now Taken the Lead in Adopting Air-Operated Door and Step Control Throughout for All Service, to the Advantage of the Public, the Platform Men and the Railway



MONTREAL DOOR EQUIPMENT—VIEW OF REAR PLATFORM ON REMODELED CAR

THE decision of the Montreal Tramways to equip practically all of its active cars with pneumatic door and step control is a whole-hearted recognition of the fact that the earning power and comfort of a car can be greatly enhanced by the largest possible use of automatic equipment.

Although the pioneer in the use of prepayment since 1905, it is a curious fact that the Montreal Tramways did not find it necessary to go to the inclosed vestibule car until 1914, at which time it placed twenty-five motor cars and twenty-five trailers in operation on St. Catherine Street, the chief traffic artery of Montreal. Of course, when the long rear platform of the earlier cars was open, no door-operating mechanism was required since the passenger operated the swinging entrance and sliding exit body doors themselves. With the introduction, however, of closed-vestibule cars in center-entrance, front-exit train service, it became evident that the value of such cars would be greatly increased by a faster door and step mechanism.

The burden which manually operated equipment placed on the conductor may be judged from the fact that in a round trip of one hour and forty-five minutes a conductor on the St. Catherine Street line might have to open and close doors for a total of 232 stops. During the rush hours, furthermore, the regular headway of two minutes is cut to thirty seconds on the section between Bleury Street and Victoria Avenue. Under these circumstances a saving of two seconds per stop, due to air operation, can prove an important factor in reducing congestion and in speeding up the schedule. Also, as one Montreal official put it: "When a conductor is opening or closing a door by hand he is failing to do something else, such as helping a passenger or collecting fare."

The new arrangement of rear entrance features was developed by Col. J. E. Hutcheson, general manager, with the assistance of A. Gaboury, superintendent, and D. E. Blair, superintendent of rolling stock. After a careful study of loading and unloading conditions, and taking into account the severe temperatures to which the occupants of the open platforms were exposed, a decision was reached as to what arrangements would best suit the situation. The mechanical department then proceeded to develop details, which seem to be of a simple and practical nature. Care was taken that the innovations had due publicity in advance, so that the public was both interested and pleased when the first cars were changed over. On completion of the first improved car, representatives of the City Council, as well as from the different papers of the city, were invited to a demonstration, which proved very satisfactory.

The company had remarkable success in securing wide publicity for the innovation, both with the men and the traveling public of Montreal. The clippings from the English and the French newspapers of Montreal, of which one of the latter is reproduced, show how cleverly an improvement in equipment can be used for the direct promotion of good public relations, as well as reminding the car men in an indirect way of what the company is continually doing for their welfare.

On March 28, 1917, the railway equipped car No. 1476 with the National Pneumatic Company's type OA-M 2⅝-in. x 4½-in. engines which were adjusted to permit the doors to open in 1.4 seconds and to close in 1.6 seconds. These periods cover the complete cycle from the first movement of the operating lever to the end of the door movement. The stroke of this engine is the same for all lengths of door as the size of the exhaust ports can be adjusted to control the speed of operation, thus greatly simplifying the adaptation of the same air engine to various styles of cars.

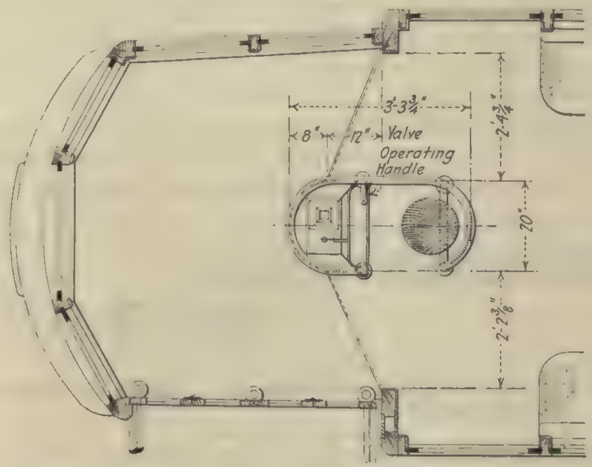
This pioneer car was paired with one of similar type, No. 1474, which had been equipped in August, 1915, with manual control to see whether such control was feasible for cars with 7-ft. platforms. However, the pneumatic equipment proved so satisfactory that the company decided to place the same engine on 590 modern cars and on the 100 new cars for the forthcoming six-motor, two-car train service. While the engines will be furnished by the National Pneumatic Company, tariff conditions made it desirable for the railway to manufacture some parts itself, particularly the step mechanism which has been modified to permit the clearance of a 12-in. depth of snow and ice.

At this writing eight cars are already being operated with pneumatic door and step control, and parts are in hand for ninety-three more. Cars of the 1425-1524 series, as illustrated, which have 7-ft. platforms inclosed with folding doors, are being converted at a cost of about $175 each. While the existing cars for train service have simple light signals to indicate the closing of the doors, the 100 new cars for train operation will carry the National Pneumatic Company's safety interlocking door control, which is interlocked with the control system.

### DOOR AND STEP ARRANGEMENT

All Montreal cars are of the two-step type, and of these steps the upper one is stationary and the lower one folds. The vestibule doors are not swung against the bottom step, but against the edge of the platform, leaving the upper step partly exposed. The main reason for doing this was that carhouse contours would be cleared even with the doors opened, whereas if the doors were on the outside edge of the second step there would be a danger of damaging door or step should a car inadvertently be pulled in with doors open. Again, on several types of cars, if the doors were to be outside of the steps it would be necessary to build out at the vestibule rail in order to get a door post.

In practice, nobody tries to get on the exposed step as it is narrow, and there are no outside grab-handles. Furthermore, the window nearest the bulkhead is closed permanently so that reckless passengers cannot get an arm over the window sill.



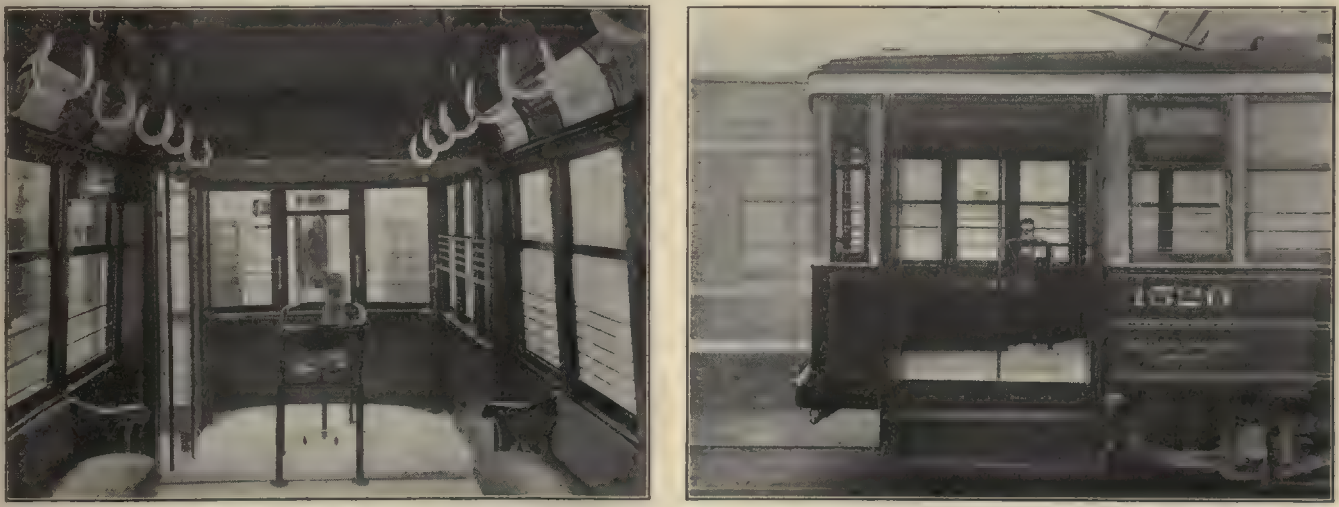
MONTREAL DOOR EQUIPMENT—PLAN OF PLATFORM SHOWING ARRANGEMENT OF FARE BOX AND CONDUCTOR'S SEAT

The successive rises from the ground to the car floor are: to first step, 16 in.; to second step, 9½ in.; to platform, 9½ in., and platform to body of car, 6 in.

### IMPROVING THE CONDUCTOR'S POSITION

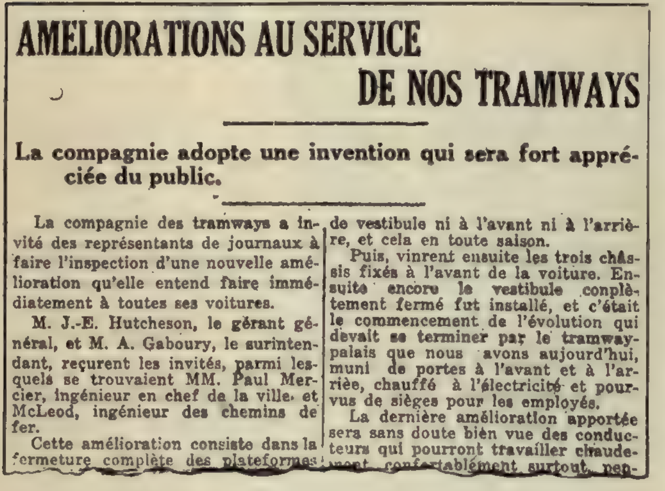
Aside from providing the conductor with the convenience of pneumatic door and step control, the Montreal Tramways has gone still further. As shown in both drawing and halftones herewith, the conductor now stands on a railed peninsula which projects 18 in. outward from the bulkhead line. This peninsula is 6 in. above the platform floor and level with car floor, thus placing the conductor well above the head of his platform passengers and giving him better supervision over them. There is also ample aisle room on both sides of the peninsula for inward and outward passengers.

By this arrangement the conductor is free from all



MONTREAL DOOR EQUIPMENT—INTERIOR AND EXTERIOR VIEWS OF PLATFORM EQUIPMENT jostling by entering or departing passengers, and is in a commanding position to see all that is going on. The opening in the railing at his side allows him to step down quickly to help a passenger up. He may also extend a chain barrier across the exit should that be necessary.

Both the push buttons and the door-operating handles are so placed that the conductor can give the stopping signals and open the doors without turning around, the mere closing of the doors being in itself the starting signal. The conductor can collect fares while seated on his folding seat since the railing carries either a Coleman or Cleveland pillar-type non-counting fare box, a table for making change and a compartment below the table for transfers, punch and other supplies. The pillar-type fare boxes, of course, may eventually replace the portable style now common in Montreal.



AMELIORATIONS AU SERVICE DE NOS TRAMWAYS

La compagnie adopte une invention qui sera fort appréciée du public.

La compagnie des tramways a invité des représentants de journaux à faire l'inspection d'une nouvelle amélioration qu'elle entend faire immédiatement à toutes ses voitures.

M. J.-E. Hutcheson, le gérant général, et M. A. Gaboury, le surintendant, reçurent les invités, parmi lesquels se trouvaient MM. Paul Mercier, ingénieur en chef de la ville, et McLeod, ingénieur des chemins de fer.

Cette amélioration consiste dans la fermeture complète des plateformes de vestibule ni à l'avant ni à l'arrière, et cela en toute saison.

Puis, vinrent ensuite les trois châssis fixés à l'avant de la voiture. Ensuite encore le vestibule conplètement fermé fut installé, et c'était le commencement de l'évolution qui devait se terminer par le tramway-palais que nous avons aujourd'hui, muni de portes à l'avant et à l'arriée, chauffé à l'électricité et pourvus de sièges pour les employés.

La dernière amélioration apportée sera sans doute bien vue des conducteurs qui pourront travailler chaudement confortablement surtout pen-

MONTREAL DOOR EQUIPMENT—HIGHLY COMPLIMENTARY REPORT ON INSTALLATION BY LOCAL NEWSPAPER—READ IT FOR YOURSELF

### The New Six-Motor Trains

A most interesting development in connection with the adoption of air-operated doors and steps is their early use on fifty six-motor (of 330 hp.), two-car trains now under construction. Each train will consist of a four-motor leader and a two-motor trailer, and will be operated on the hilly north and south lines, where four motors would not afford sufficient traction for two cars, the grades on these north and south lines being as high as 13 per cent. Flexibility, convenience and easier handling of the semi-trailers in and out of the car-house for rush-hour make-ready were other factors. The equipment specifications of these cars were published in the Electric Railway Journal for April 7, 1917, page 673.

The use of six motors for a train of two cars, of multiple unit control, of air brakes, of safety interlocking door control and of air operated doors and steps place Montreal in the front rank of American electric railways for reliability and safety in metropolitan railway operation.

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During the last twenty-four months nearly 30,000,000 passengers have been carried on the electric railway lines of the Southern Public Utilities Company, Charlotte, N. C., without a single accident.

## One-Man Cars for Massachusetts

### Résumé of Two Cases Shows Experts of Public Service Commission Favor Their Use

That the operation of the one-man car is regarded as a measure of relief in Massachusetts is evidenced by two recent applications for the Public Service Commission's sanction for their use on "lean" lines. A petition of the Concord, Maynard & Hudson Street Railway for their use on the Acton branch has been granted by the commission, the stipulations being that "when the car is running the operator shall transact no business relative to the collection of fares or the issuance of transfers, and if the operator has occasion to leave his post, he shall remove and retain in his possession the reverse handle of the controller."

The type of car approved is similar to that used at Sedalia, Mo., and is built by the American Car Company, St. Louis. It has a seating capacity of thirty-four, and is equipped with automatic safety appliances. It is mounted on a single truck, and its length over bumpers is 30 ft. 1 in.

The petition filed with the commission on Aug. 3 by the Bay State Street Railway, seeks permission to operate nineteen one-man cars on fifteen different routes, in Revere, Salem, Danvers, Beverly, North Reading, Haverhill,, Quincy, South Braintree, Randolph, Weymouth, Dedham, Hyde Park, Milton and Taunton. Several of the lines are beach resort routes, and for these it is proposed to operate the one-man cars in winter only. The company states that it has constructed two one-man cars with double-end control, of slightly different design. These have been inspected by members of the commission's inspection department. George W. Bishop, chief of the department, indorsed the request of the road, provided the same stipulation as that made in the above-mentioned decision be included in the commission's order. A public hearing on the petition was to be held on Aug. 15.

One of the cars, numbered 7000, was built by the American Car Company. It has cross seats accommodating twenty-eight persons and weighs about 15,300 lb. It has a single truck with wheelbase of 8 ft. and wheels 24 in. in diameter, and is equipped with two GE-258 motors and folding Pfingst fenders. The other car, numbered 7500, was originally built by the Jones Manufacturing Company, but has recently been rebuilt by the Bay State Company. It has longitudinal seats for twenty-six persons and weighs 21,540 lb. It has a single truck, with 6-ft. 6-in. wheelbase, and 33-in. wheels. It is equipped with two GE-67 motors. There are two trolleys and folding Pfingst fenders.

Both cars have two doors, one on the right side of each end, and each is arranged for prepayment service. The controller handle is of the "dead man" type. The cars have combination straight air and automatic emergency brakes and also hand brakes. The emergency features consist of an interconnection of the power, sand and automatic air brake with the opening of the forward door and the unlocking of the rear door. These emergency features are operated by air.

"Both of these cars appeared to be properly equipped and in condition to fulfill the requirements claimed of them," reported Inspector Arthur W. Hodges. He knew of no conditions which would prevent them being operated on the Bay State lines specified in the petition.

# What a Publicity Bureau Could Do

### The Need of Its Service in Helping the Public to Understand the Present Electric Railway Situation Is Emphasized—The General Principles Which Should Guide Its Work

By IVY L. LEE

ENORMOUS and rapidly accelerating costs of materials and labor are threatening the very corporate existence of numerous electric railway companies. Their only hope is to convince the public, which regards the historic nickel fare almost as a constitutional right, that the electric railways have not only, in all justice, a right to greater revenues, but—more important—if revenues are not increased electric railway service and facilities must be generally cut and in some cases suspended and the public itself will be the sufferer.

In the last analysis the future of the electric railway service depends upon public opinion. Courts, commissions and legislatures, consciously or unconsciously, register the views of the public. This will continue to be so. The public *en masse* of course cannot be constructive, but it is equally sure that individuals representing that mass will not be constructive beyond a point which that public desires that its representatives should go.

If this view is correct, not much progress is made by efforts to persuade individual members of commissions or legislative bodies. Such individuals are like fountains, unable to lift their waters higher than the original reservoir from which they flow. They merely register the original level of public opinion.

If the electric railway problem is to be solved, therefore, the appeal must be primarily to the public. It should be quite frankly so. The appeal should not be made to the public as against any created organization or commission, but to the public in favor of a sound general viewpoint. When the individual legislators or commissioners realize that the public has this sound viewpoint, such individuals will give expression to it in specific and constructive acts.

It is essential, then, that the appeal of electric railways should be to the public, and that the purpose of the appeal should be to inculcate in the public mind a sound general attitude toward the electric railway situation.

## II

Electric railway officers generally are agreed that everything feasible should be done to cultivate public good-will. Some of these officers are conducting their daily work with that thought in mind. Others have sought to interpret their enlightened viewpoint not only in deeds, but in speeches, consultations with trades bodies and private interviews. Yet the great mass of the people are apparently unmoved, and there is no real comprehension on the part of the public of the actual situation with which the electric railways are face to face.

The real question before the electric railway companies is: *"In what manner can revenues be raised sufficient to meet the expenditures which the public demands?"*

It does not seem debatable that any plan of action which can accomplish these results legitimately will be approved by the public at large, no matter what criticism may be made by individuals here and there.

A large number of electric railway officers feel that not only do the people fail to understand the fare situation, but that they cannot be made to understand it. This seems to be a counsel of despair, for the chaotic condition in which the railways are now placed is due in large measure to the ignorant ideas which have been instilled in the public mind, and especially to generalizations which have been arrived at on account of certain exposures which have been made of practices which either merited or received public criticism. We are certainly never going to find our "way out" if we concede that darkness must of necessity encompass us.

## III

It is absolutely necessary that the public should really be shown that there is something wrong with our system of fixed fares totally unrelated to fluctuating costs of providing service. When the public once really sees this and feels that this is unsound and threatens their transportation facilities, then we can depend upon legislatures and commissions to take hold of the situation and work out constructive details.

It would have been futile to have gone before the public with a propaganda on behalf of a system of regional reserve banks, if the public had not beforehand come to realize quite clearly that something was wrong with our banking system.

Whatever differences of viewpoint there may be on details, electric railway men are almost unanimous in their agreement that there are specific evils in the present situation—common to all companies in the United States—on which a central bureau could do most effective work. The pressing question of the moment is the emergency brought about by the rising tide of costs of materials, taxes and labor. To meet that, the roads are asking that the historic 5-cent fare be disregarded and that 6-cent fares be permitted.

But it would be of much more importance to establish a new principle in the electric railway business, namely, that no particular sum be established as a fixed rate, but that just as in gas, water or electricity service, rates and costs be established in a just relationship, based on the right of a fair return upon the value of property actually used or useful in the public service. For not until this principle is recognized will the interests of all, stockholders, investors and public, be conserved. In short, a fixed 6-cent fare is no more sound than a fixed 5-cent fare.

Again, the absolute inequity of the paving tax, inherited like the nickel fare, from the days of the horse car, is a subject on which a central bureau can do effective work.

Just at present there is a tendency on the part of commissions, in reflection of unintelligent public sentiment aroused by mistakes or misdeeds in previous street railway eras, to adopt primitive measures and permit drastic steps totally subversive of public interest.

There never is a time, indeed, when there are not general questions concerning which the public in all parts of the country need enlightenment and intelligent information.

The propositions for municipal ownership of the electric railways will require the best thought and most intelligent handling. A central bureau could do general work of the utmost value upon this.

But whatever the proposition that is to be laid before the public, it must be done through concrete statement and illustration—clearly, persistently, frankly and in good humor. Then the public will come to see that something is inherently wrong in the situation. Once the public sees that, we can depend upon Congress, state legislatures, municipalities and commissions to take hold of the problem, and, in co-operation with railway officers, work out its solution.

The conversion of the American people to a sound point of view concerning the electric railway problem is too great a task for any man or set of men. Also, there are many views as to what would constitute an absolutely sound point of view; and, of course, what will happen in the long run will be that the American people as a whole will have to grow into the possession of this sounder attitude.

But there are certain essentials of truth concerning which it is both necessary and possible that the people should be informed, clearly, continuously and persistently. It is equally necessary that the process of enlightenment should not be either directed or controlled by any man or set of men, but that it should be going on all the time, and that, wherever necessary, the most effective means possible should be available to give the work direction and impetus.

Anyone who has visited England knows how cold the houses there are. Fires are burning in some of the rooms, but the general condition is chilly. That is to-day the state of the popular atmosphere with reference to the electric railways in this country.

But there are English houses equipped with what they call "central heating plants." Such plants carry hot water or steam heat into the halls. Sometimes there are pipes into the rooms. But each room usually has its own fires; though, if desired, the steam or hot-water heat may also be turned on. If all the fires were burning, and all the radiators turned on, the house would be hot.

Now a central publicity bureau should serve as a power plant for a "central heating system" of ideas designed to develop sympathy and understanding by the public concerning the electric railway problems.

The "central heating plant" would not be doing all the work. Separate fires would be burning in the rooms of the different roads, and the heat could be turned on locally only when wanted. But the boilers would always be at work, and the halls would always be heated, diffusing warmth continually into those rooms where there were no fires at all.

## IV

Supposing a central publicity office to have been established to inform the public on the real plight of the electric railways facing rising costs with a fixed fare.

The first problem is how to get this situation before the public. Some headway is being made with public sentiment, but it is slow. I do not believe it can be fast, but I do believe it can be made increasingly effective.

Let this bureau serve as a central office. Under its direction there will be compiled various material, showing by facts and figures, simply stated, the evils of the situation. This material will be in typographical form designed to appeal to many different classes of the community. There should be leaflets, dodgers, matter for newspapers, for lyceum lecturers, for distribution on cars, etc.

In such a campaign it is vital not only to prepare good material which will attract attention and inculcate sound ideas, but to see to it that the material gets to the people.

In the distribution of material the existing organizations of the electric railways should, so far as possible, be utilized. There should be on each railway some designated individual to receive the matter prepared and distribute it over his line to officers and influential employees. Everybody should be made to understand clearly the sole intent and design, and employees should be asked to co-operate. Someone would be expected to see to it that this material got into the hands of the local press and influential citizens.

In addition, the central bureau should distribute certain material direct to a mailing list which could be developed—to include members of Congress, state legislators, mayors of cities, councilmen, presidents of colleges, economists, bankers, writers, lecturers, clergymen, etc. All material sent to this list should be in the name of an executive committee; all matter distributed by individual railways should be in their names. Everything sent out should have a responsible source.

At the headquarters and, wherever possible, by electric railway officers generally, relations should be cultivated with writers, newspaper correspondents and others of influence with a view to seeing to it that they are supplied with accurate data. The material collected by the various bureaus for electric railway economics could be drawn upon freely. In this way, writers of books, magazine articles, editorials, etc., could be provided with information.

It should be the function of the central bureau to keep in touch with the work of the various organizations which are studying electric railway problems, also institutions, such as the American Bar Association, which are urging uniformity of law. The purpose should be to harmonize and bring about co-operation between all interested agencies.

The bureau should be in constant correspondence with electric railway officers all over the United States, whose co-operation would be solicited in the collection and presentation of significant facts and data relating to the existing situation. Many companies and their officers have compiled general matter which would be decidedly illuminating if it could be made clear to the public at large.

V

Certain general principles should be rigidly adhered to in this entire campaign:

1. The source of all printed matter circulated should be made known. In fact, every act should be taken in the full light of day, frankly as a matter of duty not only to investors, but also to the public. Not a letter should be written, not a dollar should be spent, not a line should be printed which the electric railways would not be glad to make known to anybody interested.

2. Expenditures should be restricted to payments for advertising, printing, postage and necessary salaries and expenses in connection with work actually performed.

3. There should be no personalities or criticisms of commissions, individual commissioners, or anybody in public life; similarly, there should be no attacks, direct or indirect, upon labor organizations or leaders.

4. It should be the policy to restrict whatever was published to data contained in official records. Certainly every fact stated should be carefully verified before publication, although statements of fact should not be colorless, but put forward in a manner to carry conviction.

VI

Manifestly, such a plan as that outlined could not start in full bloom. There should be no occasion for haste. The wisdom of each step taken should be carefully considered. If the plan as it progresses proves to be helpful, it will grow. Individual companies will in addition themselves work out ideas suitable for presentation to their local constituencies.

Each company should itself defray the expenses incidental to its individual work. In so far as the bureau is concerned, the scheme should be financed as it progresses. Expenses at first should be small. If results justify their growth, the money will be seen to have been well spent as the work continues.

Experience with such matters would indicate that a campaign conducted along the lines indicated should prove relatively inexpensive. If a few clear-cut ideas are put into real circulation, the automatic fermentation they will produce will keep the situation active. The public will catch the idea and take hold of it on its own account. It isn't the mass of publicity work that counts; it's the quality.

VII

Some of the merits of the foregoing plan may be suggested:

1. It does not assume to direct or restrict what any electric railway management or officer may do on his own account. The subject is too big, the task too great, for that. Every earnest effort anywhere should be encouraged.

2. It does assume to keep the fires burning everywhere on the essentials, and especially on the transcendent essential that the vital necessity of the business is adequate revenue.

3. It is adaptable to changing conditions. Under it there may be co-operation in connection with publicity for increased fare, for labor arbitrations, etc.

4. It aims to co-ordinate, to energize and to work with every agency, every interest—and for the widest public advantage—which is concerned or active in the working out of this problem.

The present situation is undeniably bad; it cannot be remedied too soon. It will take time to get results, but that will be as true to-morrow as it is to-day. An energetic campaign ably conducted along the lines suggested should produce gratifying results at a cost which should be negligible in the light of the good accomplished.

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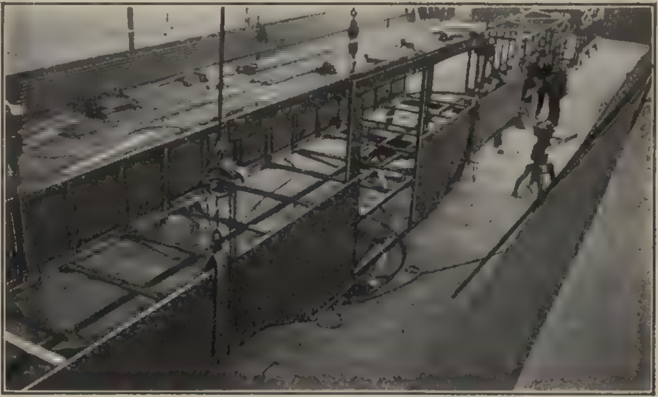
## Semi-Steel Trailers Built by Cleveland Railway

### The Company Has Undertaken the Construction of Twenty-five Cars in Its New Harvard Avenue Repair Shops

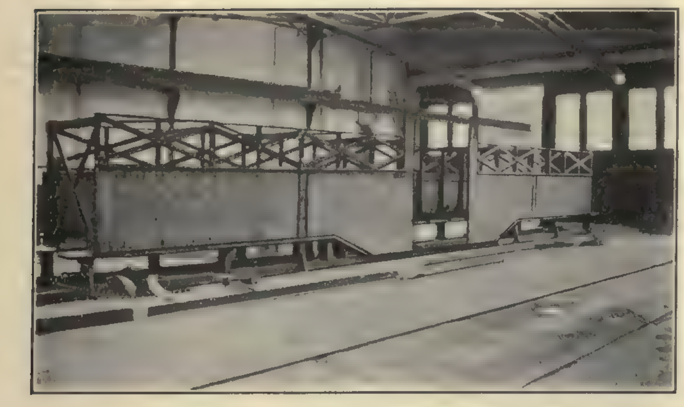
RECENTLY the excellent facilities provided in the new Harvard Avenue shops of the Cleveland Railway tempted the railway officials to undertake the construction of twenty-five 49-ft. semi-steel trail cars, and from the mechanical standpoint this venture has been entirely successful. However, inasmuch as the entire order is not completed, it is not possible to compare cost figures.

For the new cars the under frame is constructed with 4-in. channel center sills and crossings, diagonally braced at the bolsters with steel bars. The side of the car below the windows is constructed as a steel girder with a 4-in. x 4-in. x 5/16-in. angle as a lower member and a ⅜-in. x 3½-in. bar as an upper member, a ⅛-in. steel plate being in between. The channel crossings rest on the horizontal leg of the 4-in. x 4-in. angle, and are secured thereto by large 3/16-in. gusset plates. The ⅜-in. x 3½-in. bar is inside the side plates, which are flanged at the upper edge to give transverse stiffness. The posts are secured to the ⅛-in. side plate by ⅛-in. x 1¼-in. x 1¼-in. angles.

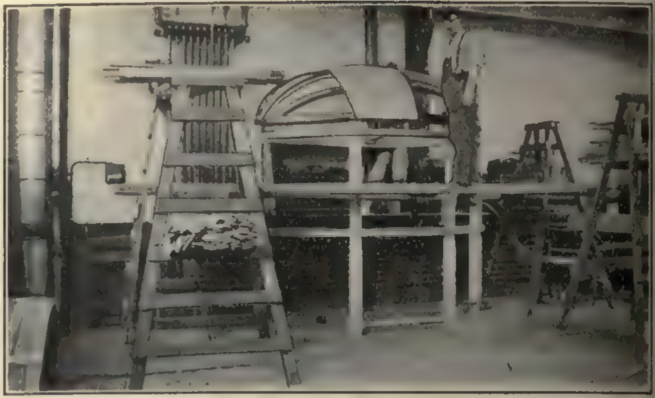


CLEVELAND SEMI-STEEL TRAILER—SIDE GIRDERS IN JIG SUBSEQUENT TO RIVETING AND READY FOR REMOVAL

The roof of the car is of the railway company's standard contour plain arch type. It is built on steel carlines cut from No. 14 sheet steel. At the upper edge of the carline a 1-in. x 1-in. wood strip is bolted, to which the roof boards are nailed. At the lower edge of the carline another wood strip is bolted, to which the headlining is fastened.

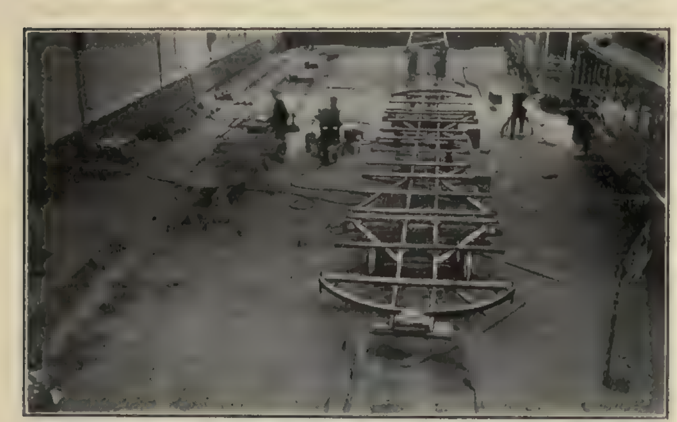


CLEVELAND SEMI-STEEL TRAILER—SIDE GIRDERS BEING SWUNG INTO PLACE PRIOR TO RIVETING TO FLOOR FRAMING



CLEVELAND SEMI-STEEL TRAILER—CONSTRUCTION OF VESTIBULE FRAMING IS SEPARATE UNIT

The floor of the car is fastened to wood fillers, placed between the flanges of the 4-in. channel crossings. It is covered with the usual mat strips running lengthwise with the car. In addition to these, three strips of Kass Safety tread are placed in the aisle to prevent slipping of passengers' feet.



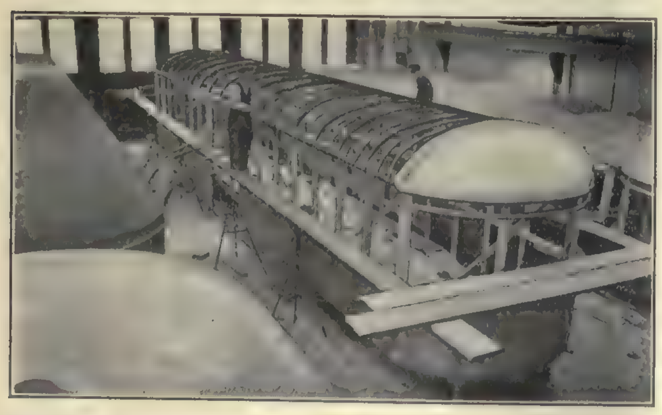
CLEVELAND SEMI-STEEL TRAILER—FLOOR FRAMING ASSEMBLED AND READY FOR ATTACHMENT OF SIDE GIRDERS

Brass sash are used, dropping into pockets between the longitudinal seat backs and the outer wall of the car. The doors are of wood and are arranged to slide into pockets at each side of the doorway, being operated by National Pneumatic door engines. The engine valves are controlled by means of levers and rods, connected to a handle under the money table of the fare box stand. The center window in each end of the car is arranged to be lowered by small increments, Cleveland Trolley Supply Company's sash locks being used for this purpose. This arrangement will give additional ventilation. The interior finish of the car is dark cherry. The seats are upholstered with rattan, over wood frames. The posts are of ash, and miscellaneous framing is of Georgia pine.

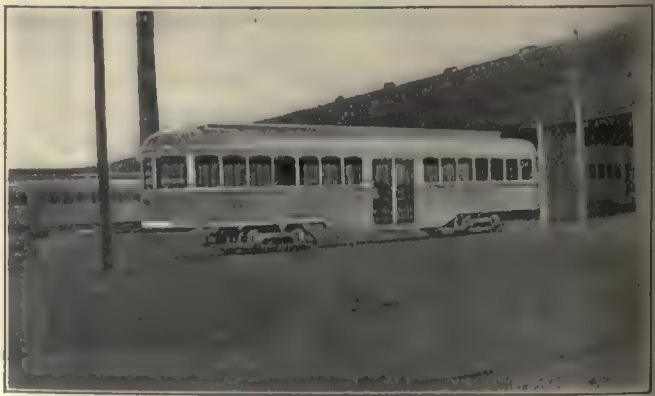
Other equipment used on the cars include Consolidated signals, Cleveland fare box, Nichols-Lintern indicating tail lamps, Peter Smith heaters, Brill 67-F trucks, Tomlinson couplers, Westinghouse semi-automatic air brakes and Agasote headlining. The curtains are of printed duck, mounted on Curtain Supply Company's fixtures. Twenty-two-inch wheels are used, permitting a floor height of 29½ in. The car has seating capacity for sixty passengers.

For the construction of the car bodies the engineering department at the shops furnished the detail drawings for the cars and supervised the initial stages of construction. After material for the work was gotten out, the center sills and crossings were assembled on dummy trucks. The side girders, which were built on a form, or jig, were then hoisted into place at the ends of the crossings and riveted thereto. The posts at each side and the vestibules were then inserted, having previously been assembled in units. The roof was built on the car and the vestibules installed as units.

Throughout the work the shop force was divided into different groups, each being responsible for its part of the work of construction. Weight and cost figures, which are not available at present, will be published at a later date.



CLEVELAND SEMI-STEEL TRAILER—ROOF AND SIDE FRAMING OF CAR DURING INSTALLATION OF INTERMEDIATE CARLINES



CLEVELAND SEMI-STEEL TRAILER—VIEW OF COMPLETED CAR SHOWING ENTRANCE AND EXIT DOORS AT CENTER

# Experts Testify to Increased Costs

## Authoritative Evidence Presented New York Second District Commission to Show Burden of Higher Material and Labor Costs on Electric Railway Industry

IN amplification of the news account in last week's issue the ELECTRIC RAILWAY JOURNAL has secured from the record before the Public Service Commission for the Second District of New York the details of the general evidence presented in the pending fare cases of twenty-eight electric railways. This evidence, which was introduced at Albany by the committee on ways and means to obtain additional revenue of the New York Electric Railway Association, is an unusually authoritative statement, made under oath before a public tribunal, of the course of prices within recent years. The testimony should attract wide attention throughout the country, both because it was delivered by some of the leading figures in the supply field after careful special preparation, and also because it is generally applicable throughout the country.

Practically every form of material and every class of labor has largely increased in cost in the last five years, and more especially in the last twelve months. It was the consensus of opinion of the witnesses that the end has not yet been reached and that further increases in costs in most lines seem probable. No witness testified that there would be any decrease in costs in the next year or two in his field.

### ELECTRIC EQUIPMENT COSTS GO UP

Edmund P. Waller, assistant manager of the railway department of the General Electric Company, testified that beginning with the middle or the latter part of 1914 there had been a steady and continually more rapid increase in the price of the electrical equipment and apparatus manufactured by his company. The percentages of increase in the selling prices prevailing to-day as compared with those existing in the latter part of 1914 are about as follows:

| | Per Cent Increase |
|---|---|
| Railway motors and car equipment | 65- 70 |
| Air brakes | 60- 65 |
| Locomotives | 60- 65 |
| Rotary converters | 45- 50 |
| Transformers | 50- 60 |
| Switchboards | 75- 80 |
| Motor generators | 55- 60 |
| Turbines | 100-120 |

Mr. Waller saw no prospect of any substantial reduction in prices for the near future. Roscoe Seybold, manager of the price section of the railway department and car department of the Westinghouse Electric & Manufacturing Company, presented testimony showing approximately the same increases in cost as that given by Mr. Waller.

### OILS SHOW FIRST INCREASE IN TWENTY YEARS

Lauren J. Drake, Jr., vice-president of the Galena ignal Oil Company, testified that the prices per gallon and per pound of the various classes of oils and greases manufactured by his company had remained the same for more than twenty years and that no advance was made until April 20, 1917.

The chief method of selling oils to electric railways is on a mileage basis for cars and a kilowatt-hour basis for power houses. The witness testified that while the oils are invoiced to all electric lines at one price (f.o.b. Franklin), with freight to point of delivery added, their guarantees on cost of operation on a mileage basis or kilowatt output basis may vary, depending upon the kind of equipment in the particular service. The company furnishes a certain amount of oils to smaller companies upon a gallonage basis, without a guaranty clause.

The following tabulation, presented by Mr. Drake, shows a comparison of prices on electric railway oils and greases for a period of more than twenty years prior to April 20, 1917, with the present prices, which have been in effect since April 20, 1917:

| Name | F.o.b. Franklin Prices for Twenty Years Prior to April 20, 1917, Cents | F.o.b. Franklin Prices Since April 20, 1917, Cents |
|---|---|---|
| Galena power house valve oil, per gallon | 47 | 55 |
| Galena power house engine oil, per gallon | 27 | 30 |
| Galena turbine oil, per gallon | 32 | 35 |
| Galena electric car oil, per gallon | 17 | 20 |
| Galena air compressor oil, per gallon | 23 | 27 |
| Galena motor grease, per pound | 7½ | 8½ |
| Galena gear grease, per pound | 4 | 5 |

### HOW BRAKE EQUIPMENT HAS BEEN AFFECTED

W. G. Kaylor of the Westinghouse Traction Brake Company, testified that the list prices of his company had remained substantially the same for a number of years. He stated that "generally our contracts with our regular customers provide that the purchase of air brakes and equipment shall be at 25 per cent from list prices. Since April, 1917, a revision of our prices has been in effect, and our contract customers have been required to pay list prices less 5 per cent, instead of 25 per cent, resulting in an advance of 26.7 per cent on standard air-brake material. Our casual customers are now paying 105 per cent."

James S. Thompson, vice-president of the American Brake Shoe & Foundry Company, testified that about a year ago his company made increases in the selling prices of brake shoes for electric railways. At that time and for some years prior thereto the average price of his company's brake shoes for electric lines had not varied materially. In the latter portion of 1916 the prices were speedily accelerated, and to-day the average price of brakeshoes to electric railways generally throughout the country is an increase of 63 per cent over and above the prices current a year ago.

### CAR COST DOUBLED SINCE OUTBREAK OF WAR

One of the most interesting witnesses was W. H. Heulings, Jr., vice-president in charge of sales of the J. G. Brill Company. Mr. Heulings testified that it was almost impossible to measure, by a comparison of the quotations for finished cars, the advance in the price of such equipment. He stated that the J. G. Brill Company had never but once within his experience exactly duplicated an order for equipment. Sufficient changes were always made in the specifications to require an extensive revision in the plans and a consequent revision of price.

He stated, however, that in general it was safe to say that the cost of equipment was at least twice as great as the figure prevailing at the outbreak of the European War, and that the same situation existed with reference to the various parts necessary for current maintenance. Whereas formerly the cost of a car was made up roughly of a dollar of material to every dollar expended for labor, the advance in the price of steel, copper, lumber and other elements entering into the manufacture of cars has been so great that at the present time there is roughly $2 of material for every $1 of labor represented in the cost of equipment. This is true notwithstanding the large increase in labor costs.

### MANUFACTURERS' COSTS HAVE JUMPED

Perhaps there has been an impression in some quarters that the large increases in costs have been due entirely to arbitrary exactions on the part of manufacturers. One of the most interesting phases of the testimony presented was the recital by the various witnesses as to how their costs had in turn increased. As evidence of the fact that higher prices have not meant larger profits, Mr. Heulings pointed out that the gross manufacturing profit of his company was less than 1½ per cent on the volume of business transacted, and that were it not for large government orders, utilizing the greater part of the shop capacity, a heavy loss would have been incurred.

By taking the testimony of the various witnesses relating to increased costs of raw materials used by them, some very interesting results may be disclosed. The following table shows the approximate percentage increase in price of the several articles since the latter part of 1914:

| | Per Cent | | Per Cent |
|---|---|---|---|
| Pig iron | 310 | Asbestos materials | 600 |
| Steel plates | 700 | Other insulation materials | 100 |
| Copper | 100 | Magnetic sheet steel | 375 |
| Steel castings | 200 | Pennsylvania crude oil | 95 |
| Spelter | 52 | Whale oil | 34 |
| Coke | 170 | No. 1 lard oil | 89 |
| Mica | 150 | | |

### RAILWAY LABOR COST TO GO STILL HIGHER

Prof. Roswell C. McCrea of Columbia University testified on behalf of the electric railways as an expert on labor. Basing his study upon the formal annual reports of the companies to the Public Service Commission and the investigations of the national and New York State governments as to wages and conditions of employment in other industries, he reached some very interesting conclusions. His study of the wages paid by the petitioning companies disclosed substantial increases in every case. Their weighted average wage (in cents per hour) for the more important classes of labor in each year from 1911 to 1915 inclusive compared as follows:

| | 1911 | 1912 | 1913 | 1914 | 1915 | Per Cent Increase 1915 Over 1911 |
|---|---|---|---|---|---|---|
| Conductors | 21.7 | 23.3 | 25.9 | 25.7 | 27.1 | 24 |
| Motormen | 22.2 | 23.5 | 25.1 | 25.8 | 27.2 | 22 |
| Roadmen or trackmen | 16.6 | 16.6 | 18.9 | 18.5 | 18.7 | 12 |

The witness further testified to the well-known fact that approximately 50 per cent of the operating expenses of an electric railway represent wages, and by far the larger part of this wage expenditure is represented by payments to conductors, motormen and trackmen. The higher cost of labor alone has increased the cost of operation—on the basis of the continuance of an identical standard, both as regards maintenance and the volume and the character of service—more than 15 per cent in the last five years.

Professor McCrea said that owing to the existence of contracts between the companies and the Amalgamated Association of Street & Electric Railway Employees the advance in wages has not been so rapid in the last year as has been the increase in the cost of supplies of every character. It was his opinion, however, that when these wage agreements expire there will be in many cases a sharp increase in wages. He pointed out that in numerous instances the hourly wage rates have not advanced so rapidly as wages for labor in other industries into which electric railway workers could easily gravitate. The railways were therefore more than justified, in the opinion of the witness, in making the advances in wages which have been granted during recent years, and the increasing cost of operation resulting therefrom was a proper charge and should be borne by the public. Against the high wage rates in other industries must be offset, of course, the greater steadiness of employment offered by the electric railway, but even with making due allowance for all such considerations, the Public Service Commission must face the fact that labor costs will probably be considerably increased in the next year or so.

In response to questions as to the outlook for lower wages in the immediate future, Professor McCrea stated that as far as could be seen there was no likelihood of such a development. The great destruction of men and materials in the European War; the large demand which will be made upon this country for goods of every character to facilitate the rehabilitation of the warring nations; the almost inevitable attempts which will be made by European countries to prevent emigration, and the new illiteracy test written into the immigration law will all combine to make labor scarce, and hence wage rates high.

Professor McCrea pointed out that increases in wage rates in the electric railway industry are justified in view of the rapid rise in living costs. While it is possible that living costs may materially decrease, as the result of activities of the federal government and of other influences, even a material reduction would not have any influence in effecting a reduction in the prevailing wage rates.

Several witnesses pointed out that the electric railway is peculiarly affected by the high cost both of labor and of materials. In the first place, the expenditures for labor of an electric railway represent a very much larger proportion of the total operating expenses than is the case with other public utilities. In the second place, the materials which have been subjected to the largest advances in price are those which are used by electric railways. The war has made tremendous demands for the same classes of materials, and the industry has been forced to compete in a famine market, in which the situation each day becomes more serious.

# Traffic Recorder Helps Service

## Simplified Method of Recording Receipts from Passengers and Their Points of Travel Results in a Large Yearly Saving and Valuable Traffic Records

By GEORGE JACKSON
General Manager North Jersey Rapid Transit Company, Hohokus, N. J.

THE North Jersey Rapid Transit Company line extends from Paterson, N. J., to Suffern, N. Y., a distance of 15 miles, passing through nine small towns with populations of 600 to 7000. It is built according to regular interurban electric railway specifications on its own right-of-way throughout and operates at a schedule speed of about 18 m.p.h.

The fares are based on about 2 cents per mile but are arranged in multiples of 5 cents. There are eighteen station stops, and the maximum fare is 25 cents, so that considerable overlapping of 5-cent fares is necessitated. About half of the traffic is through business to Paterson, and the remainder local business from town to town.

When the company started operation about seven years ago, it decided that some form of duplex ticket was the best method of collecting and auditing fares. The zone system of collecting fares was out of the question on account of the overlapping of zones and the great expense of proper inspection.

We adopted a form of duplex ticket arranged so that the origination and destination points as well as the amount of fare would be punched. These tickets were audited in connection with an adding and listing machine, each station having its number. The auditing of these tickets showed how much cash the conductor should turn in and showed the travel of each passenger. It also made the form against which the inspector's reports were checked.

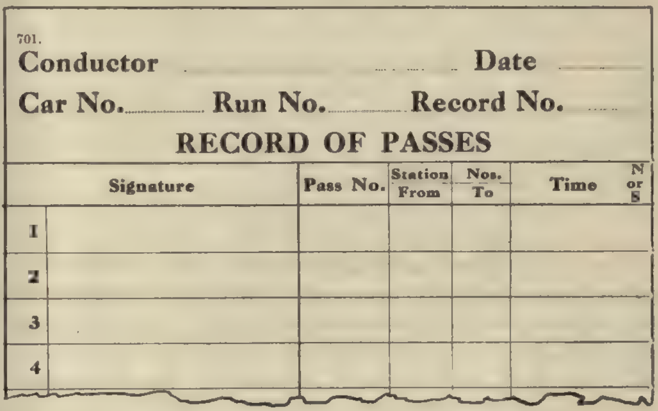
About two years ago we negotiated with the Bonham Recorder Company for the use of its recorders, appreciating that this device would eliminate the expense of duplex tickets and at least half of the expense of office work and would put the whole responsibility of proper fare registration up to the conductor so that intermediate errors in auditing the fares would be eliminated, yet all the information that we had been getting before would still be obtained. We installed eight of these recorders in February, 1917, and after six months' trial we have found them a practical machine both in the matter of operation by the conductor and in facilitating office work. On an investment of $2,800 we are saving $1,275 a year, of which $650 is in clerical expense alone.

The Bonham traffic recorder is a listing machine on which is placed a dial, and it is located in one end of the car. The recorder has a number of type wheels arranged so that by operating rods located along the side of the car, the origination and destination points and, automatically, the proper amount of fare are registered on a slip of paper about 4 in. wide. The number of cash fares and passes or tickets is also shown on this paper, and, where needed, the passenger fare-mileage is shown. The back of the recorder has some hand-set wheels whereby the number of the car, trip, time or other data may be recorded on the paper by the conductor.

### OPERATION OF THE RECORDER

The operation of this recorder is as follows:

Before the car comes to a station the origination pointer of the dial is set by a rod running along the side of the car overhead with hand grips placed at regular intervals. Should several passengers board the car at this station, the destination point of each passenger is recorded by turning another rod, which is located about 4 in. from the first-mentioned rod, and then pulling a register cord, which records the origination and destination and amount of fare in the recorder. Where the fare collected is a pass or ticket, a blank is shown in the cash column on the record. We take care of our record of passes by the use of Form 701 (Fig. 1), on which the pass-holder signs his name while the conductor adds the interstation identification of the ride.



701.

Conductor Date

Car No. Run No. Record No.

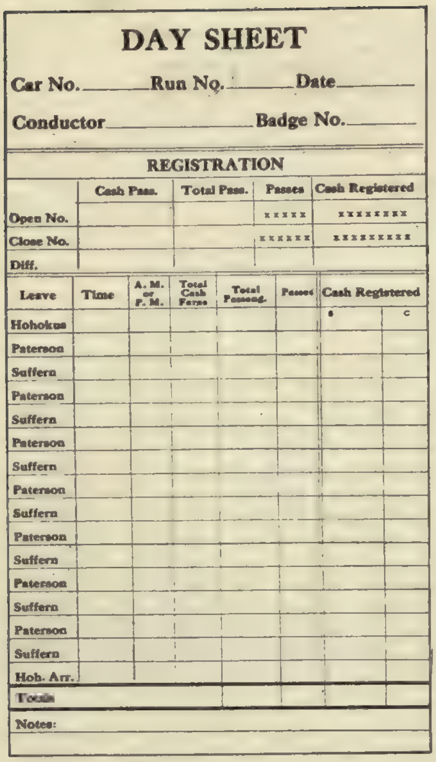
RECORD OF PASSES

| | Signature | Pass No. | Station From | Nos. To | Time | N or S |
|---|---|---|---|---|---|---|
| 1 | | | | | | |
| 2 | | | | | | |
| 3 | | | | | | |
| 4 | | | | | | |

TRAFFIC RECORDER—FIG. 1—PASS RECORD

With this method of collecting fares both passengers and inspectors see the full operation of the conductor while collecting fares. The conductor does not have access to the register and cannot see the printed record.

The records are taken from each car operated during the day after it has finished its run. In our case this occurs after 12 o'clock midnight. These records and the day sheet are audited during the next morning, the work being completed about 11 o'clock. In about three hours one clerk takes care of approximately 2500 fares, including the inspection of day sheets, the adding of the audit slips, the making up the daily traffic records as to the number of passengers, etc. Each record slip as it comes out of the recorder has the autograph of the conductor made in the manner similar to the auto-



**DAY SHEET**

Car No. ______ Run No. ______ Date ______

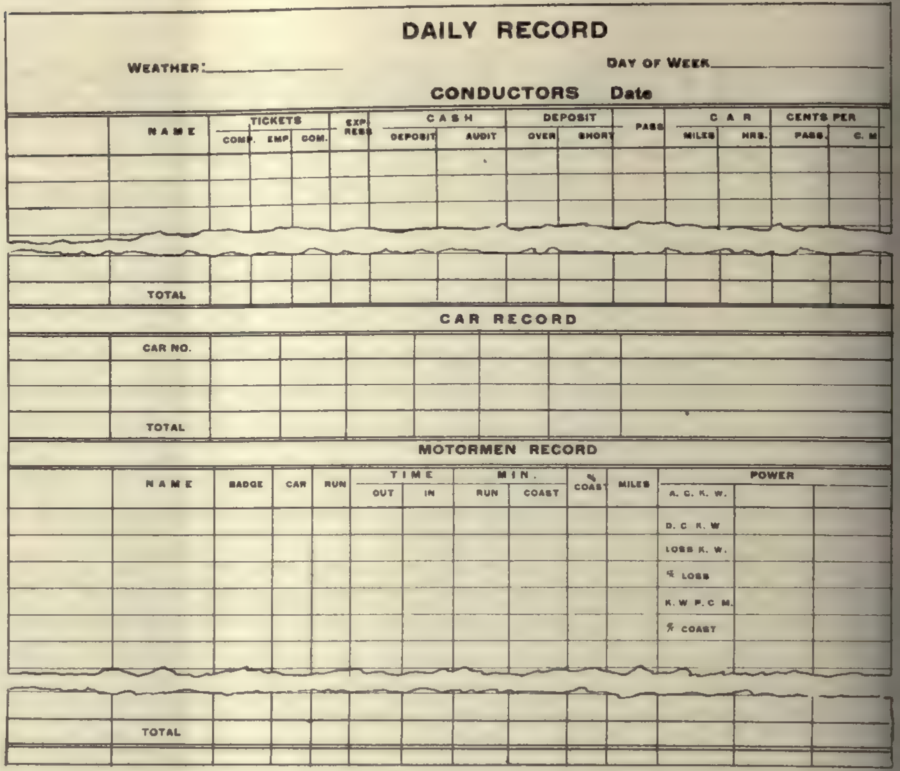
Conductor ______ Badge No. ______

**REGISTRATION**

| | Cash Pass. | Total Pass. | Passes | Cash Registered |
|---|---|---|---|---|
| Open No. | | | xxxxx | xxxxxxxx |
| Close No. | | | xxxxxx | xxxxxxxxx |
| Diff. | | | | |

| Leave | Time | A. M. or P. M. | Total Cash Fares | Total Passeng. | Passes | Cash Registered $ | c |
|---|---|---|---|---|---|---|---|
| Hohokus | | | | | | | |
| Paterson | | | | | | | |
| Suffern | | | | | | | |
| Paterson | | | | | | | |
| Suffern | | | | | | | |
| Paterson | | | | | | | |
| Suffern | | | | | | | |
| Paterson | | | | | | | |
| Suffern | | | | | | | |
| Paterson | | | | | | | |
| Suffern | | | | | | | |
| Paterson | | | | | | | |
| Suffern | | | | | | | |
| Paterson | | | | | | | |
| Suffern | | | | | | | |
| Hob. Arr. | | | | | | | |
| Totals | | | | | | | |

Notes:



**DAILY RECORD**

WEATHER: ______ DAY OF WEEK ______

**CONDUCTORS** Date

| | NAME | TICKETS COMP. | TICKETS EMP. | TICKETS COM. | EXPRESS | CASH DEPOSIT | CASH AUDIT | DEPOSIT OVER | DEPOSIT SHORT | PASS | CAR MILES | CAR HRS. | CENTS PER PASS. | CENTS PER C. M |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | |
| | TOTAL | | | | | | | | | | | | | |

**CAR RECORD**

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | CAR NO. | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | TOTAL | | | | | | | |

**MOTORMEN RECORD**

| | NAME | BADGE | CAR | RUN | TIME OUT | TIME IN | MIN. RUN | MIN. COAST | % COAST | MILES | POWER | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | | | A. C. K. W. | | |
| | | | | | | | | | | | D. C K. W | | |
| | | | | | | | | | | | LOSS K. W. | | |
| | | | | | | | | | | | % LOSS | | |
| | | | | | | | | | | | K. W P. C M. | | |
| | | | | | | | | | | | % COAST | | |
| | | | | | | | | | | | | | |
| | | | | | | | | | | | | | |
| | TOTAL | | | | | | | | | | | | |

TRAFFIC RECORDER—FIG. 2—CONDUCTOR'S DAY SHEET; FIG. 4—DAILY RECORD OF CONDUCTORS, MADE UP BY AUDITING CLERKS

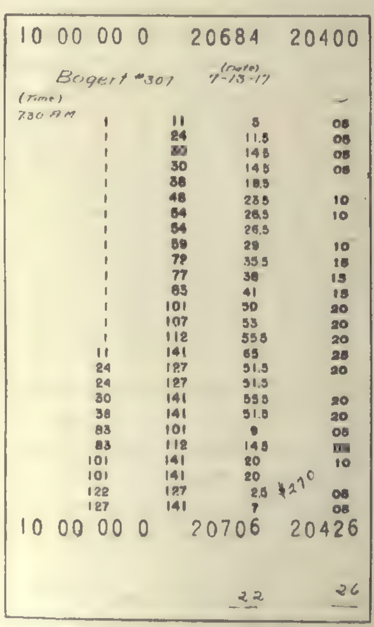
graphic kodak. However, in making up the records for office use, we find it desirable to transfer the signature nearer the actual records, owing to the fact that the autographic name comes out upside down and at some inches distant from the recordings.

### USE OF RECORDS

The day sheet (Fig. 2) shows the usual information such as car number, date and conductor, the time of the car leaving each terminal, a column for total cash fares, column for total passenger fares, one for passes, and finally a column for cash registered. The conductor fills in the top of the day sheet and gives the time the car left each terminal, the remainder of the day sheet being completed by the accounting department.

Fig. 3 shows a typical record for a half trip, as made by the recorder. At the left of this record will be seen, top and bottom, the number 10 00 00 0. Of these seven numbers, the first two are used by us to indicate the car. The other five might be employed to designate the train number, trip number or any other identification, but are not utilized by us. The next set of numbers, top and bottom (20,684 and 20,706), show by their difference the cash fares collected, in this case twenty-two. The final set of large numbers, top and bottom (20,400 and 20,426), show by their difference the number of passengers carried, in this case twenty-six, because four passengers rode on passes. Of the four columns of figures in the body of the record, the first shows the point of origin and the second the point of destination of each passenger. The third column is a record of the distance traveled by each passenger, and may be arranged to read in miles or in some predetermined fraction of a mile. In our case it reads at about one-fifth of a mile, but as our fares are based approximately on the number of miles traveled, but not close enough to make this column of use to us, we do not utilize this column. On some roads, however, it might prove useful. The final column gives the fares collected from each passenger, the blank spaces in this column being the four passes already mentioned. These passes are recorded by pulling the "no fare" rope running through the car.

The time shown on the left side of the paper, 7.30 a. m., is written on this record by the auditing department after the record is taken from the machine. It is taken from the day sheet which has been filled out by the conductor. The amount, $2.70 near the lower right-hand corner, is also written in by the auditing department as the amount of cash which should have been collected during the half trip. This record shows, therefore, the amount the conductor is over or short in his



10 00 00 0 20684 20400

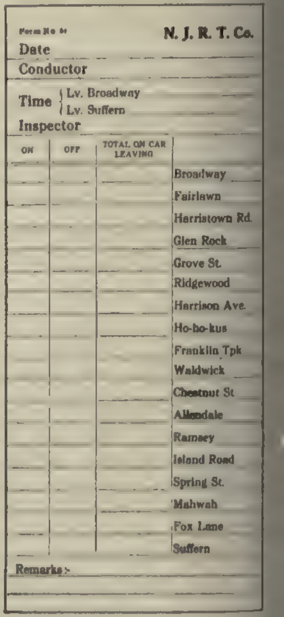
Bogert #307 (Date) 7-13-17

(Time) 730 AM

| | | | |
|---|---|---|---|
| | | | — |
| 1 | 11 | 5 | 05 |
| 1 | 24 | 11.5 | 05 |
| 1 | 30 | 14.5 | 05 |
| 1 | 30 | 14.5 | 05 |
| 1 | 38 | 18.5 | |
| 1 | 48 | 23.5 | 10 |
| 1 | 54 | 26.5 | 10 |
| 1 | 54 | 26.5 | |
| 1 | 59 | 29 | 10 |
| 1 | 72 | 35.5 | 15 |
| 1 | 77 | 38 | 15 |
| 1 | 83 | 41 | 15 |
| 1 | 101 | 50 | 20 |
| 1 | 107 | 53 | 20 |
| 1 | 112 | 55.5 | 20 |
| 11 | 141 | 65 | 25 |
| 24 | 127 | 51.5 | 20 |
| 24 | 127 | 51.5 | |
| 30 | 141 | 55.5 | 20 |
| 38 | 141 | 51.5 | 20 |
| 83 | 101 | 9 | 05 |
| 83 | 112 | 14.5 | [illegible] |
| 101 | 141 | 20 | 10 |
| 101 | 141 | 20 | |
| 122 | 127 | 2.5 $270 | 05 |
| 127 | 141 | 7 | 05 |

10 00 00 0 20706 20426

22 26



Form No. 64 **N. J. R. T. Co.**

Date

Conductor

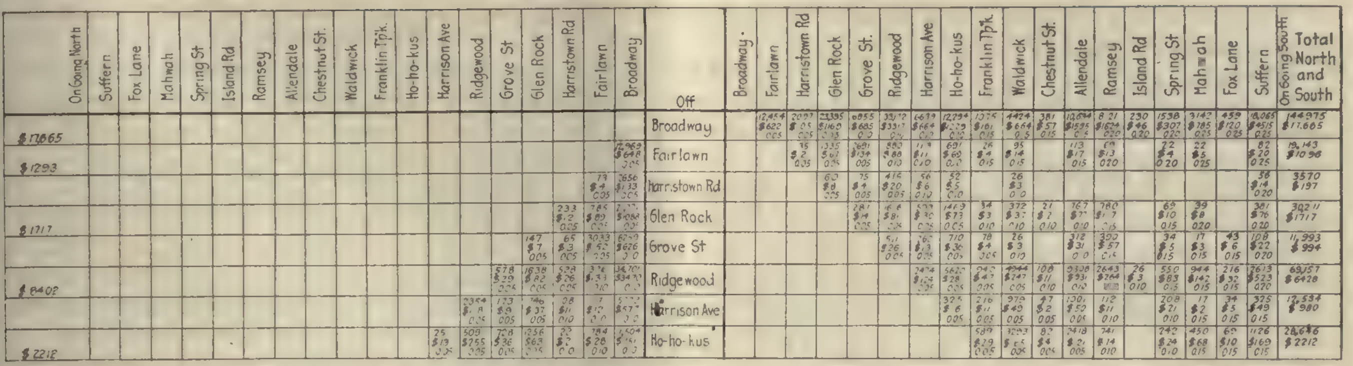
Time { Lv. Broadway
{ Lv. Suffern

Inspector

| ON | OFF | TOTAL ON CAR LEAVING | |
|---|---|---|---|
| | | | Broadway |
| | | | Fairlawn |
| | | | Harristown Rd. |
| | | | Glen Rock |
| | | | Grove St. |
| | | | Ridgewood |
| | | | Harrison Ave. |
| | | | Ho-ho-kus |
| | | | Franklin Tpk |
| | | | Waldwick |
| | | | Chestnut St |
| | | | Allendale |
| | | | Ramsey |
| | | | Island Road |
| | | | Spring St. |
| | | | Mahwah |
| | | | Fox Lane |
| | | | Suffern |

Remarks:-

TRAFFIC RECORDER—FIG. 3—TYPICAL RECORD; FIG. 5—INSPECTORS' TALLY



| On Going North | Suffern | Fox Lane | Mahwah | Spring St | Island Rd | Ramsey | Allendale | Chestnut St. | Waldwick | Franklin Tpk. | Ho-ho-kus | Harrison Ave | Ridgewood | Grove St | Glen Rock | Harristown Rd | Fairlawn | Broadway | Off |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| $17665 | | | | | | | | | | | | | | | | | | | Broadway |
| $1293 | | | | | | | | | | | | | | | | | | 12,969<br>$648<br>005 | Fairlawn |
| | | | | | | | | | | | | | | | | | 73<br>$4<br>005 | 3656<br>$133<br>005 | Harristown Rd |
| $1717 | | | | | | | | | | | | | | | | 233<br>$12<br>005 | 785<br>$39<br>005 | [illegible]<br>$1088<br>005 | Glen Rock |
| | | | | | | | | | | | | | | | 147<br>$7<br>005 | 65<br>$3<br>005 | 3033<br>$152<br>005 | 6259<br>$626<br>010 | Grove St |
| $8402 | | | | | | | | | | | | | | 578<br>$29<br>005 | 1638<br>$82<br>005 | 528<br>$26<br>005 | [illegible]<br>$33<br>010 | 34,701<br>$3470<br>010 | Ridgewood |
| | | | | | | | | | | | | | 2354<br>$118<br>005 | 173<br>$9<br>005 | 746<br>$37<br>005 | 108<br>$11<br>010 | [illegible]<br>$12<br>010 | [illegible]<br>$577<br>010 | Harrison Ave |
| $2212 | | | | | | | | | | | | 25<br>$13<br>[illegible] | 509<br>$255<br>005 | 728<br>$36<br>005 | 1256<br>$63<br>005 | 22<br>$2<br>010 | 284<br>$28<br>010 | 1,504<br>$151<br>010 | Ho-ho-kus |

| Off | Broadway | Fairlawn | Harristown Rd | Glen Rock | Grove St. | Ridgewood | Harrison Ave | Ho-ho-kus | Franklin Tpk. | Waldwick | Chestnut St. | Allendale | Ramsey | Island Rd | Spring St | Mahwah | Fox Lane | Suffern | On Going South Total North and South |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Broadway | | 12,454<br>$622<br>005 | 2097<br>$105<br>005 | 23,395<br>$1169<br>005 | 6855<br>$685<br>010 | 33,172<br>$3317<br>010 | 6639<br>$664<br>010 | 12,294<br>$1229<br>010 | 1075<br>$161<br>015 | 4424<br>$664<br>015 | 381<br>$57<br>015 | 10,634<br>$1595<br>015 | 8121<br>$1624<br>020 | 230<br>$46<br>020 | 1538<br>$307<br>020 | 3142<br>$785<br>025 | 459<br>$120<br>025 | 18,065<br>$4515<br>025 | 144,975<br>$17,665 |
| Fairlawn | | | 35<br>$2<br>005 | 1335<br>$67<br>005 | 2691<br>$134<br>005 | 880<br>$88<br>010 | 119<br>$11<br>010 | 691<br>$69<br>010 | 26<br>$4<br>015 | 95<br>$14<br>015 | | 113<br>$17<br>015 | 69<br>$13<br>020 | | 22<br>$4<br>020 | 22<br>$5<br>025 | | 82<br>$20<br>025 | 19,143<br>$1098 |
| Harristown Rd | | | | 60<br>$3<br>005 | 75<br>$4<br>005 | 415<br>$20<br>005 | 56<br>$6<br>010 | 52<br>$5<br>010 | | 26<br>$3<br>010 | | | | | | | | 56<br>$14<br>020 | 3570<br>$197 |
| Glen Rock | | | | | 281<br>$14<br>005 | 1616<br>$81<br>005 | [illegible]<br>$30<br>005 | 1469<br>$73<br>005 | 34<br>$3<br>010 | 372<br>$37<br>010 | 21<br>$2<br>010 | 767<br>$77<br>010 | 780<br>$117<br>015 | | 69<br>$10<br>015 | 39<br>$8<br>020 | | 381<br>$76<br>020 | 30,211<br>$1717 |
| Grove St | | | | | | 511<br>$26<br>005 | 265<br>$13<br>005 | 710<br>$36<br>005 | 78<br>$4<br>005 | 26<br>$3<br>010 | | 312<br>$31<br>010 | 380<br>$57<br>015 | | 34<br>$5<br>015 | 17<br>$3<br>015 | 43<br>$6<br>015 | 108<br>$22<br>020 | 11,993<br>$994 |
| Ridgewood | | | | | | | 2474<br>$124<br>005 | 5625<br>$28[illegible]<br>005 | 942<br>$47<br>005 | 4944<br>$247<br>005 | 108<br>$11<br>010 | 9308<br>$931<br>010 | 2643<br>$264<br>[illegible] | 26<br>$3<br>010 | 550<br>$83<br>015 | 944<br>$142<br>015 | 216<br>$32<br>015 | 2613<br>$523<br>020 | 69,157<br>$6428 |
| Harrison Ave | | | | | | | | 325<br>$6<br>005 | 216<br>$11<br>005 | 979<br>$49<br>005 | 47<br>$2<br>005 | 1001<br>$50<br>005 | 112<br>$11<br>010 | | 208<br>$21<br>010 | 17<br>$2<br>015 | 34<br>$5<br>015 | 325<br>$49<br>015 | 17,534<br>$980 |
| Ho-ho-kus | | | | | | | | | 589<br>$29<br>005 | 3293<br>$[illegible]<br>005 | 82<br>$4<br>005 | 2418<br>$121<br>005 | 741<br>$74<br>010 | | 242<br>$24<br>010 | 450<br>$68<br>015 | 69<br>$10<br>015 | 1126<br>$169<br>015 | 28,646<br>$2212 |

TRAFFIC RECORDER—FIG. 6—UPPER HALF OF TABLE MADE UP TO SHOW LOCI OF TRAVEL DURING 1913

cash turn-in, as the conductor does not have access to this record, but is supposed to turn in all his receipts except his own change money. The auditing department also writes in the trip number, which we designate by the time the car leaves each terminal and the number of passengers on each trip. All of these figures are then transferred to the day sheet, Fig. 2, and from the day sheet to the daily record, Fig. 4, on which the records of all conductors are shown in one summary.

One valuable feature of the Bonham traffic recorder is the facility of inspection. Fig. 5 is the slip given to the inspector, who may be a uniformed inspector or a secret service man. The printed records of interstation riding enable an inspector to check up any car through one point or different inspectors to check up the same car through different points without riding the car or otherwise showing themselves.

Since we have installed these recorders, we have obtained an increase in passenger rates of 1 cent on each zone or 5-cent ride. As we are now operating under this new schedule of fares, all the totals in the fourth column in the traffic record are corrected by simply adding 20 per cent. Later we expect to have the cash wheels changed so that the proper fare will be recorded after each registration.

### Records Used for Traffic Statistics

From time to time we make use of these traffic records for the purpose of analyzing our interstation travel. This has been done in Fig. 6, which is the upper part of a table drafted to show the loci of travel during 1913. The number of passengers carried between the stations during the year is given on the first line in each square. The receipts are shown on the second line, and the rate of fare on the third line. The data in this table were obtained by averaging twelve weeks, one week from each month, and multiplying the result by fifty-two. Holidays were not included, the purpose of this particular table being to give average figures of the normal travel. Only about half of the table is shown in Fig. 6, as its purpose is to show the method of tabulating the results rather than the actual figures. Statistics of this kind, forming a continuous traffic count, are obviously useful in many ways. Thus, in one instance, where we were asked to put on extra service at the northerly end of the railroad, and in another, where we were asked for extra service on account of entertainments in one of the towns along the line, our records proved clearly that our regular service would carry everyone that would want to use the cars at any special time.

We also wished to know the amount of through-passenger traffic in relation to our total traffic, namely, the number of passengers and the revenue. From the record slips, we learned directly that our through passenger traffic was 42 per cent in number of passengers and 55 per cent in revenue. We also learned that during 1916 our local business paid 6.78 cents per passenger and our through traffic 12.06 cents per passenger, and that the average of all traffic was 9.06 cents per passenger. These figures indicated clearly to us the general desirability of concentrating on the promotion of through travel.

Identification hat checks are used by the conductors when they think it is necessary; otherwise no paper is used with the present system of fare collection.

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## New Philadelphia Lease Submitted to Councils

### City Fixed Charges to Be Paid Before Dividends—No Dividend Guarantee, but Fare Determination by Commission if Rate Falls Below 4%—Board of Supervising Engineers

THE Twining rapid transit lease providing for the operation of the new city lines in Philadelphia and the lines of the Philadelphia Rapid Transit Company as a unified transportation system, was introduced into councils in the form of an ordinance on Aug. 17. The lease was approved by Mayor Smith on Aug. 13. In making an announcement to this effect, the Mayor said that a final conference had been held for several hours by Director Twining and representatives of the company, and that both city and company officials had agreed upon the terms. City Solicitor Connelly had also passed upon the lease and approved it.

### Basic Principles Underlying Lease

The lease is based upon the following principles:

1. That the interest and sinking fund payments on the bonds issued by the city to pay for its transit lines must be paid out of the gross revenue of the unified system before any deductions are made for dividends to the company's stockholders.

2. That although the city does not object to a reasonable dividend for the company's stockholders, it must make no guarantees.

3. That the Public Service Commission is the body constituted by law to determine what are just and reasonable rates of fare. That the present rates of fare on the company's own lines should at the beginning be retained with a flat 5-cent fare on the city's lines, and free transfers between the city's lines and between the

city's lines and the company's surface lines; but that if these rates of fare should not be sufficient to enable the company to pay the city's interest and sinking fund charges and a reasonable dividend to the company's stockholders, the commission should be asked to establish just and reasonable rates of fare.

4. That the obligations of the company to furnish efficient service, not only on the city's lines but on its own lines, can best be enforced by the creation of a Board of Supervising Engineers with large powers over equipment, operation, extensions, accounting and reserve funds.

### DETAILED POINTS OF PROPOSED CONTRACT

The principal provisions of the newly proposed contract between the city and the Philadelphia Rapid Transit Company follow:

*a.* The city is to build and mainly equip the lines that have already been authorized by Councils. The company is to supply in the main the power and transmission equipment. If the city desires, the company will also furnish tracks, third-rail, signals and rolling stock, provided it can secure the money for such equipment at not more than 6 per cent.

*b.* The company agrees to build all extensions of its own system recommended by the Board of Supervising Engineers and approved by the Public Service Commission.

*c.* Prior to the initial operation of the first section of the city's system, the company is to operate its own lines as at present, but subject to the regulatory power of the Board of Supervising Engineers.

*d.* The company is to pay as rental for the use of the city's lines an amount equal to the interest and sinking fund charges on the bonds issued by the city to construct the lines.

*e.* The following payments are to be made in the order named from the total revenue of the unified systems:

1. All expenses of operation and maintenance.
2. Taxes of all kinds.
3. Fixed charges and rentals of the company.
4. Interest and sinking fund payments on securities of the company issued to obtain new capital for extensions to its own lines and equipment for the city's lines.
5. Payments into the various reserve, depreciation and contingency funds necessary for the prudent businesslike operation of the unified system.
6. Payments due the city under the 1907 contract.
7. Payments into the city treasury of an amount equal to the interest and sinking fund charges on the city bonds issued to pay for the city's lines.
8. A dividend to the stockholders of the company. As long as the present 3-cent exchange tickets are maintained, this dividend is limited to 5 per cent per annum. When exchange tickets are abolished by the company, or abolished or modified by the Public Service Commission, the company, if the gross earnings are sufficient, may pay a dividend not exceeding 6 per cent, cumulative from the date of the contract; the provisions of the 1907 contract allowing a cumulative 6 per cent dividend from Jan. 1, 1907, to date being waived.
9. Payments to the Sinking Fund Commission established under the 1907 contract, equal in amount to 4 per cent upon such of the city's bonds as shall have been retired by the use of money previously paid into the sinking fund under Section 7, above. This item will not be payable until about thirty years hence, when the first bonds will be retired.
10. Limited payments into an operating surplus fund.
11. The remainder, if any, is to be divided 50 per cent to the city and 50 per cent to the company, as provided in the 1907 contract.

The foregoing payments are to be cumulative in the order named.

*f.* At the beginning the fare will be 5 cents on the city's lines. On the company's lines the present fare will for the present be retained. There will be free transfers between (1) the city's lines, (2) the city's lines and the Market Street subway-elevated line, (3) the city's lines and the company's surface lines, except in what is designated the "delivery district."

*g.* Both parties to the contract recognize the right of the Public Service Commission to determine what is a just and reasonable rate of fare. Whenever the gross revenue for six months is not sufficient to pay all prior charges and a dividend of 4 per cent to the company, the city conceding the fairness of such a dividend, the city agrees to join in a petition to the commission for a determination of what is a proper rate of fare.

*h.* To regulate the service and generally supervise the operation of the unified system, a Board of Supervising Engineers will be established. The board will consist of three members, one appointed by the city, one by the company ~~and~~ the third jointly by the Mayor and the president of the company. The board will have the power:

1. To report to Councils on the advisability of extensions of the city's lines and extensions of the company's lines, and of its own initiative to petition the Public Service Commission to require the company to construct extensions of its own lines.
2. To supervise the plans for and the cost of transit facilities.
3. To establish rules and standards as to maintenance and service, regulate the routing of cars, establish stations and stopping points and determine the adequacy of equipment.
4. To recommend to the Public Service Commission changes in fares.
5. To decide upon the amount and classification of the depreciation and contingency reserve funds, and to act as trustee therefor.
6. To act as a board of arbitrators on any question arising between the city and the company under the contract.

*i.* The term of the lease will expire on July 1, 1957, which is the date fixed for the expiration of the 1907 contract.

*j.* As under the 1907 contract, the city may, on and after July 1, 1957, purchase all of the company's property by paying to the company the par value of its capital stock outstanding at the date of purchase. In addition to this right, between July 1, 1927, and July 1, 1957, the city may purchase the property of the company by paying a like amount, plus any shortage of dividends on the company capital stock now outstanding below 5 per cent for each year from the date of the lease to the date of purchase.

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## Bureau of Mines Issues Resuscitation Chart

As a part of its work in furthering the movement for accident reduction in all branches of industry the United States Bureau of Mines has issued for free distribution a chart on resuscitation from gas asphyxiation, drowning and electric shock for the purpose of inducing the adoption of the standard Schaefer or prone pressure method of artificial respiration. The chart is 11 in. x 15 in. in size, convenient for framing or use on bulletin boards. Copies of the chart may be obtained on application to the Director of the Bureau of Mines, Washington, D. C.

# EQUIPMENT and MAINTENANCE

HAVE YOU A GOOD WAY
OF DOING A JOB?
—*Pass It Along*

*In This Issue:* F. H. Hill Tells Why It Was Not Feasible to Use a Central Concrete Mixing Plant in Elmira, N. Y.

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## A Central Concrete Mixing Plant and Why It Failed

BY FREDERIC H. HILL
General Manager Elmira Water, Light & Railroad Company, Elmira, N. Y.

In connection with a large track and paving job which we recently had on hand, an attempt was made to mix concrete at a central plant and transport the mixture to the job, a distance of little more than ½ mile over paved streets. The object of this plan was to minimize the labor of handling materials and also to avoid blocking the streets to the degree that is necessary when the usual methods are employed.

At our main generating station the coal is brought to the plant over a railroad trestle. The coal may be discharged from the cars either directly into a receiving hopper for distribution in the building, or through the trestle to the ground below where it is handled to and from the storage pile by means of a Brown-Hoist electric locomotive crane of 12-ton capacity and equipped with a clamshell bucket. Advantage was taken of this layout for the handling of sand and crushed stone for concrete and ballast. Arrangements were made whereby these materials were to be brought in hopper-bottom cars and discharged below the trestle where they could be reached by the crane. A Ransome motor-driven concrete mixer, having a capacity of ½ cu. yd. to ¾ cu. yd. per batch, was mounted on an elevated platform and arranged to discharge into a receiving hopper having a capacity of about 5 cu. yd. This hopper was erected at such a height that its contents could be discharged through suitable valves into the dumping body of a motor truck. The mixer was fitted with a receiving hopper having a capacity of one batch. The equipment was conveniently arranged with the expectation that a foreman and seven men could operate the plant and mix as fast as a crew of twenty-five to thirty men with a portable mixer on the street.

Upon beginning operation difficulties were encountered which resulted in the abandonment of the scheme and a return to the use of a portable mixing plant on the street. The plans were to mix the concrete and discharge it into the hopper so that the motor truck would always find a load in readiness. It could then be quickly loaded and thereby be kept in continuous operation. It was found, however, that during the time necessary to mix 3 cu. yd. or 4 cu. yd. the first batch assumed an initial set, making it very difficult to get the material out of the hopper. The truck was loaded with considerable difficulty and sent to the street with its load. Here it was necessary to use picks in unloading. A second trial was made by mixing and discharging directly into the truck, the interior of which had been greased. The same difficulty of unloading was encountered, only in lesser degree. Various other experiments were tried, including the use of bottom-dump wagons, adding hydrated lime to the mixture, etc., but all without success. In all cases the loads were discharged onto an asphalt pavement and shoveled into place, requiring considerable labor, and the resulting concrete was not up to requirements.

It was found that our equipment and methods lacked certain essentials which are necessary for the successful operation of a central mixing plant. The first essential is that of maximum possible speed in all operations. The hoists or elevators for handling materials must either in themselves be high-speed devices, or elevated storage bins must be provided for sand and gravel, so that low-speed machinery of large capacity can keep ahead of the mixing. We found that our mixer was operating at much too low a speed. This defect could have been remedied, but even with slow mixing the crane was unable to keep material ahead, and therefore a higher speed of mixing would not have solved the problem. The mixer should be geared to deliver a batch every one and one-half minutes. Preferably a mixer of at least 1 cu. yd. capacity should be used.

It is not practicable to store the mixture even for the brief time necessary to mix a wagon load, because it assumes an initial set almost immediately. The mixer should discharge directly into the distributing carts. Preferably these carts should have circular bottoms and be so arranged as to be completely inverted when discharging a load. Where the concrete is to be hauled a considerable distance special trucks should be provided so that about four 1-cu. yd. bodies could be transported per trip. With such an outfit loading could be done in about six minutes, and, while there would be some set before arriving at destination, the invertible feature of the bodies should permit of quick unloading. Arrangements should also be made so that loads could be discharged from the trucks directly into place, thus avoiding the necessity for rehandling.

To meet all these requirements would necessitate so much special construction and equipment that a central plant does not appear attractive except for very extensive operations. We are of the opinion that for street railway track construction the portable mixer plant will as a rule work out the best. Careful study should be given to improved methods of handling the material on the street and it is possible that a portable material handling equipment in connection with the mixer could be worked out to advantage.

## Applying System in the Office

### Uniform Desk Arrangement and Dewey Decimal Filing System Part of Denver Tramway Efficiency Methods

Every desk in the office of the Denver Tramway Company engineering department is arranged so that there is a uniform place in each for certain things. Consequently in the absence of any man another can go to his desk and readily find any matter of company business. This applies to the chief engineer, Edward A. West, as well as to all of his assistants. He is firmly of the opinion, and the engineering department works on this basis, that no man can handle more than one subject at a time and that consequently there should be but one order of business on the desk before him at any time. This uniform arrangement of the desk and concentration upon one item at a time eliminates the frequent occurrence of a matter getting lost in "the pile," and facilitates the rapid movement of company business through the engineering department.

It thus becomes easily possible for any man to clear his desk before leaving at any time, since he has only one order of business before him and there is a place in his desk assigned to this in case it must be held. As a result of this, every desk is entirely free of papers and the like when not actively in use.

OLD FILES REBUILT TO UNIFORM DIMENSIONS

In the chief engineer's office, where frequent reference to various maps is necessary, these are kept from cluttering the desk by having them mounted in a wing cabinet supported on one wall. The number of wings in this cabinet is governed by the number of maps which are in active use. If reference to any one of these is required it may be lifted from its support and laid on the desk for study. When returned, the cabinet is closed up, forming simply a piece of furniture with no prints or paper in evidence.

### FILING SYSTEM EMPLOYED

Working along the line of systematization of all the engineering department's business, all individual files of the department which were previously distributed among the several division heads and the chief engineer are now concentrated in one general file which has been completely worked over and all filing done in accordance with the Dewey decimal system. The files previously in use were of various sizes and styles and constructed of both wood and steel. As the company did not care to purchase a complete new set of filing equipment, the wooden files were rebuilt to conform in general dimensions with the modern steel files and all the cabinets were grouped together and painted a uniform green color, giving the appearance of a system purchased all at one time and originally built to standard dimensions. A view of the filing cabinets as they appear now is shown herewith. All filing in the department is done by a single clerk, who is alone responsible for the filing of all engineering department matter.

## Paint and Varnish versus Enamel

### Two Years' Experience with Eight Cars per Week Through the Paint Shop Favors Enamel

BY G. J. SMITH

Superintendent of Rolling Stock and Shops, Kansas City (Mo.) Railways

At the time the receivers for this company were discharged its cars had been painted a dark Pullman green for a period of about sixteen years. The interior, including the headlining, had been finished in natural wood. The new management decided to change the color standard from a dark to a light color. The idea in mind was that a car of light color could be seen for a greater distance on the street, and also that the light color would make a better appearance and would cause the improvements to be noticed by the public. The new colors selected were used as follows:

The body below the belt rail and including the sashes was painted a deep orange; the side posts, letterboard and headlining, cream; the sash, a deep orange, the same as the body, and there was a small amount of Tuscan red trimming. The original plan was to repaint to the light color only such cars as required complete painting, and on cars which were in such physical condition as would permit of revarnishing, the plan was not to change the color until the cars came in for complete repainting. This plan would have required approximately seven years in which to change the color of all the cars.

At about this period we had been experimenting more or less with air-drying enamels, and as a further study of their use we took a car with the surface in good condition, except for the varnish, and instead of revarnishing the surface we decided to sandpaper it, to touch up such bad spots as had been caused by contact with other objects, and to give the car two coats of enamel directly over the old green surface. After fourteen months this car was brought to the shops and given a thorough cleaning and inspection. In physical condition and appearance it was found to be superior to a car that had been revarnished for the same period of time.

On the strength of this finding we decided to discontinue revarnishing over the dark colors and to change all the cars directly to the light color at once by enameling directly over the old green surface. The result has been entirely satisfactory. Cars which have now been in service two years or more require no additional painting. It is our judgment at present that cars renewed by this process will not require reshopping for painting in a shorter period of time than two and one-half years.

The cost of enameling over the old paint with two coats of enamel is approximately $2.50 more than the cost of revarnishing. This extra cost is made up of approximately $1 for labor and $1.50 for material.

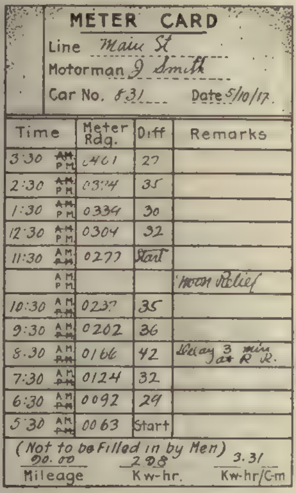
# Suggested Power-Saving Test

### An Inexpensive Method of Conducting Tests to Determine Actual and Possible Energy Saving in Car Operation

THE engineers of the Sangamo Electric Company have worked out the following plan for securing reliable data regarding power-consumption economies, and they believe that this method will give more reliable results than would less systematic tests extending over greater periods. For test purposes it is recommended that a line representative of the average traffic conditions for the property, and normally using not less than twelve or fifteen regular cars, be selected.

## GENERAL PRINCIPLES

On four of the regular cars watt-hour meters are installed in plain view of the motorman, and on four others meters are installed out of sight of the motorman. The first four are designed as "test" meters, and the second four as "reference" meters. The test meters are used to determine the decrease in energy consumption per car-mile due to instruction in efficient operation.



METER CARD

Line *Main St*

Motorman *J Smith*

Car No. *831* Date *5/10/17*

| Time | Meter Rdg. | Diff | Remarks |
|---|---|---|---|
| 3:30 ~~AM~~ PM | 0401 | 27 | |
| 2:30 ~~AM~~ PM | 0374 | 35 | |
| 1:30 ~~AM~~ PM | 0339 | 30 | |
| 12:30 ~~AM~~ PM | 0304 | 32 | |
| 11:30 AM ~~PM~~ | 0277 | Start | |
| AM PM | | | Noon Relief |
| 10:30 AM ~~PM~~ | 0237 | 35 | |
| 9:30 AM ~~PM~~ | 0202 | 36 | |
| 8:30 AM ~~PM~~ | 0166 | 42 | Delay 3 min at R R. |
| 7:30 AM ~~PM~~ | 0124 | 32 | |
| 6:30 AM ~~PM~~ | 0092 | 29 | |
| 5:30 AM ~~PM~~ | 0063 | Start | |

(Not to be Filled in by Men)

| Mileage | Kw-hr. | Kw-hr/C-m |
|---|---|---|
| 90.00 | 298 | 3.31 |

SUGGESTED FORM OF METER CARD

The reference meters are used as an index of traffic conditions and to determine the average energy consumption that would have occurred on the "test-metered" cars if instruction in efficient operation had not been given.

In order to eliminate the variable human element in operation, all motormen are rotated regularly through the "reference-metered" cars so that the measurements represent the actual average operating conditions for the line. Inasmuch as the men do not know that their operation is being checked, because the meters are hidden and read secretly, it is assumed that they will operate at present efficiency on these reference-metered cars, and will not practice economical operation. Any increase or decrease in energy consumption per car-mile for the reference-metered cars will, therefore, represent the increase or decrease in severity of traffic conditions, and can be used as a base from which to determine the actual saving obtained on the test-metered cars.

In the test it is desirable to use eight cars of the same type and equipment, if possible, but otherwise each individual reference-metered car should be compared with a test-metered car of the same type.

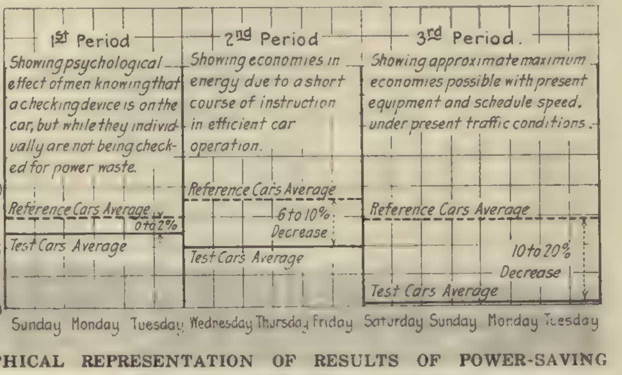
The test is divided into three periods, two of three days' duration each and one of four days' duration. In order that the initial test figures may not be determined under unusually severe conditions, it is advisable that the test be started on a Sunday and continued during the ten following days. The eight cars should be run on the same line, and, if possible, should average twelve or eighteen hours per day.

The first test is to determine the effect upon the men of seeing a checking device on the car, but knowing that they individually are not being checked for energy waste. This is accomplished as follows: All of the men are rotated through both test and reference cars, each man getting at least one-half day each on a test car and on a reference car. The reference meters are read secretly every night at the carhouse. The mileage and energy consumption for the period are totaled and the average consumption per car-mile for the reference cars is determined.

The test cars are run through this first period with the meter dials masked. They are read nightly at the carhouse and the average energy consumption per car-mile for the period is determined as with the reference meters. The per cent difference between the test meters and the reference meters represents the psychological effect sought. Tests already made show that this psychological saving varies from almost insignificant figures to 2 per cent or 3 per cent.

## DETERMINING THE RESULTS OF INSTRUCTION

The purpose of the second period of the test is to show the effect of a short course of instruction in efficient car operation. All of the men are rotated through both test and reference cars, each man getting at least a half day on each type of car. The reference meters are read, and the average energy consumption per car-mile for the period is determined as before. The masks are removed from the dials of the test meters, and the motorman reads the meters at the end of each round trip, putting down the results on a card like that reproduced herewith. These cards are handed in daily. The energy consumption per car-mile for the test cars is figured from these daily meter cards.



GRAPHICAL REPRESENTATION OF RESULTS OF POWER-SAVING TEST WITH WATT-HOUR METERS

The difference between the results with the two types of cars represents the economies resulting from the instruction. Practice has shown that this saving varies from 6 to 10 per cent.

It should be noted that while the general average of all readings is reliable, too much weight must not be attached to the daily or trip energy readings of individual motormen, as during this short period they will have encountered different traffic conditions.

## MAXIMUM ECONOMY POSSIBLE DUE TO INSTRUCTION

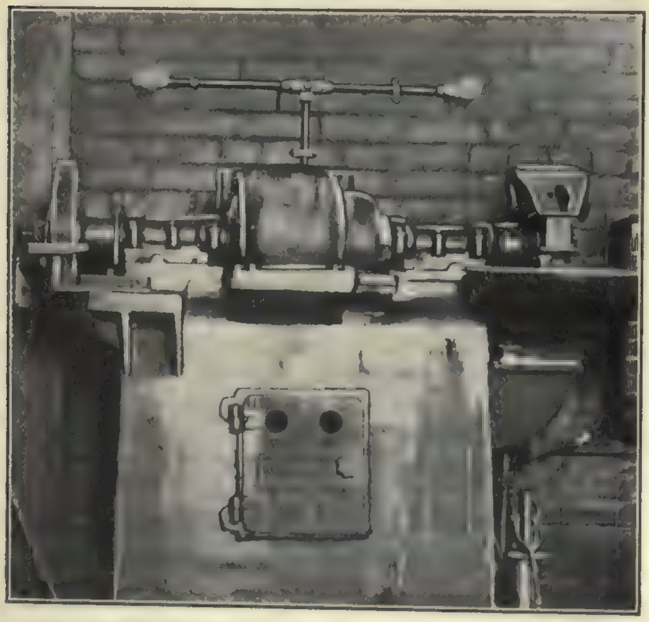
The third test period is utilized to determine the maximum economy possible through instruction in efficient operation with present equipment and scheduled speeds, and under present traffic conditions. All of the men are rotated through the reference cars, but only four or six picked men are used to operate the test cars during this period. Of these, two or three are selected as good operators, while the others are of middling operating efficiency. These men are picked from personal observation rather than from records made with the meters. They are given thorough instruction, and operate each a test car at least two full days. They read the meters at the end of each trip and turn in daily meter cards.

The energy calculations are made for the reference meters as in the preceding two periods, and for the test meters as in the second period. The difference represents the maximum economy that can be expected under existing conditions, and experience has shown that this will amount to from 10 per cent to 20 per cent, depending upon the actual "slack" in the line.

A diagram has been reproduced to show average test results for the three periods. It will be noted that there is an increase in energy per car-mile for the reference cars through the second period, and a decrease in the third period. Such variations are due to varying demands on the service on different days. However, as both test cars and reference cars operate under these same varying conditions, this error is eliminated, and a decrease in energy consumption can be attributed solely to instruction and to the daily checking of the individual man's energy consumption.

## Safety Lights Installed Over Grinding Machine

In the shops of the overhead department of the Cleveland Railway, a double-wheel, motor-driven grinder is installed in a room which is rather dark. To eliminate the possibility of anyone touching the wheels while the grinder is running, two red lights were installed above the grinder and connected in the motor-control circuit so that they would be lighted and, therefore, give warning whenever the machine was running. It is impossible for the motor to be running without these lights being turned on. Illumination for working with the machine is provided when needed by a lamp which hangs directly over the machine, the two warning lights being of very small wattage.



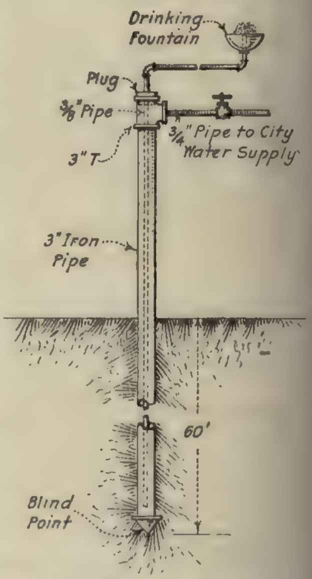
RED LIGHTS WARN OF DANGER WHEN GRINDER IS RUNNING

## Shop's Drinking Water Problem Solved

BY T. C. RODERICK

Electrical Engineer Grand Rapids (Mich.) Railway

After we had found it necessary to issue an order against the shop men drinking water from a well near the shop on account of the presence of colon germs, it became necessary to provide them with a satisfactory substitute. The first attempt was a scheme for icing the city water which, aside from its temperature, is satisfactory owing to its treatment at a new filtration plant. The men complained, however, that this water was too cold. An attempt to moderate the degree of icing also proved unsuccessful, for the water was then too warm. Realizing that spring water or well water which has the temperature of the ground from which it is drawn is at the best temperature for human consumption, we devised the following scheme which has proved eminently satisfactory for supplying water free from germs at the ground temperature.



ICELESS COLD WATER DRINKING FOUNTAIN

A 3-in. iron pipe with a blind point at one end was driven 60 ft. in the ground. At the top a T-fitting was installed and into this a ¾-in. connection to the city water supply was tapped. A ⅜-in. pipe extending to the bottom of the 3-in. pipe was then inserted and supported from the plug at the top end of the T-fitting. This small pipe was connected to the drinking fountain a few feet away and inside the shop. Through these connections, the city water pressure keeps the 3-in. pipe filled and forces the water up through the small pipe inside, the larger pipe thus acting as a storage well for the city water. As the water is drawn off at the drinking fountain, it is taken from the bottom of this well, 60 ft. in the ground, and it has the temperature of the sand and gravel and cold water surrounding the 3-in. pipe.

Tests have been made showing that the temperature of the city water as it entered the pipe was 72 deg. while the temperature of that drawn out at the drinking fountain was 52 deg. On an extremely hot day recently, after the drinking fountain had been used heavily all the forenoon by trainmen and laborers as well as by the shop men, a test was made which showed the temperature of the water entering the pipe to be 80 deg., while that which was drawn at the drinking fountain was 56 deg.

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The Bay State Street Railway, Boston, Mass., estimates for the year ending June 30, 1918, an expenditure for coal of $1,512,000. This includes 35,000 tons at $7.50 per ton and 125,000 at $10 per ton. The company has paid the following prices for coal during the past four years: 1914, $3.50; 1915, $3.55; 1916, $3.80; 1917, $4.55.

# Cost Data on Special Work Renewals—II

By M. BERNARD

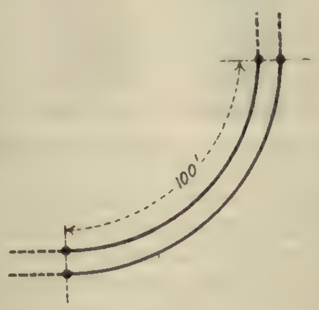
Assistant Engineer Way & Structures Department,
Brooklyn (N. Y.) Rapid Transit System

**This is the second plate of the series of Cost Data on Special Work renewals. An editorial on the series appears on page 256 of this issue. The first plate was published in the issue for July 21, page 108.**

**Fig. 3—Single Track Plain Curve (90 Deg.)**

Length—100 ft. single track

Construction removed—9-in. girder rail—8-in. granite on sand
New construction—7-in. girder rail—5-in. granite on concrete
Pavement outside of track—Sheet asphalt



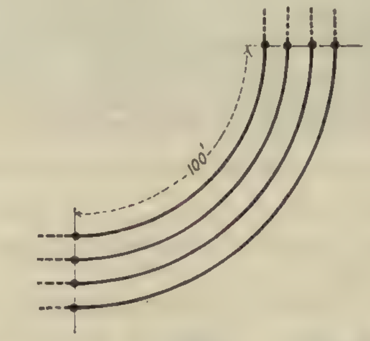
| | Light Traffic | Average Traffic | Heavy Traffic |
|---|---|---|---|
| Labor | $143.00 | $175.00 | $200.00 |
| Handling | 80.00 | 95.00 | 110.00 |
| Miscellaneous | 30.00 | 35.00 | 45.00 |
| Total (except materials) | $253.00 | $305.00 | $355.00 |
| Cost per single track foot | 2.53 | 3.05 | 3.55 |

Cost of replacement of sheet asphalt not included.

**Fig. 4—Double Track Plain Curve (90 Deg.)**

Length—200 ft. single track

Construction removed—9-in. girder rail—8-in. granite on sand
New construction—7-in. girder rail—5-in. granite on concrete
Pavement outside of track—Sheet asphalt



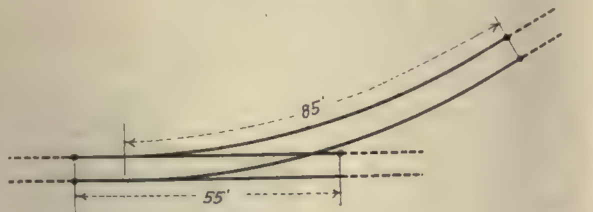
| | Light Traffic | Average Traffic | Heavy Traffic |
|---|---|---|---|
| Labor | $295.00 | $370.00 | $415.00 |
| Handling | 165.00 | 200.00 | 230.00 |
| Miscellaneous | 65.00 | 75.00 | 90.00 |
| Total (except materials) | $525.00 | $645.00 | $735.00 |
| Cost per single track foot | 2.63 | 3.23 | 3.68 |

Cost of replacement of sheet asphalt not included.

**Fig. 5—Single Track Branch-off (30 Deg.)**

Length—140 ft. single track

Construction removed—9-in. girder rail*—8-in. granite on sand
New construction—9-in. girder rail*—8-in. granite on concrete

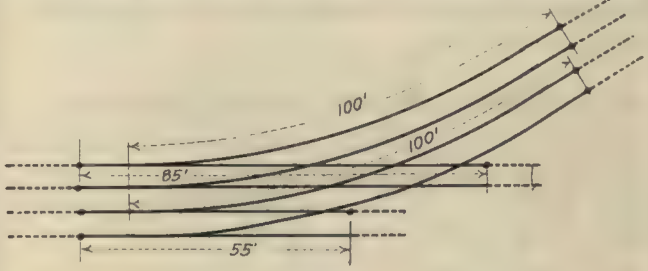


| | Light Traffic | Average Traffic | Heavy Traffic |
|---|---|---|---|
| Labor | $240.00 | $290.00 | $350.00 |
| Handling | 70.00 | 80.00 | 90.00 |
| Miscellaneous | 35.00 | 40.00 | 45.00 |
| Total (except materials) | $345.00 | $410.00 | $485.00 |
| Cost per single track foot | 2.47 | 2.93 | 3.46 |

**Fig. 6—Double Track Branch-off (30 Deg.)**

Length—340 ft. single track

Construction removed—9-in. girder rail*—8-in. granite on sand
New construction—9-in. girder rail*—8-in. granite on concrete



| | Light Traffic | Average Traffic | Heavy Traffic |
|---|---|---|---|
| Labor | $610.00 | $715.00 | $855.00 |
| Handling | 185.00 | 205.00 | 240.00 |
| Miscellaneous | 90.00 | 105.00 | 120.00 |
| Total (except materials) | $885.00 | $1,025.00 | $1,215.00 |
| Cost per single track foot | 2.60 | 3.02 | 3.57 |

*Hard-center construction. *Explanation:* By "light traffic" is meant either the divergence of cars during progress of work, or a traffic of not more than 150 cars per day of twenty-four hours. "Average traffic" denotes the passage of about 325 cars per day of twenty-four hours, and "heavy traffic" that of 750 or more.

By "labor" is meant the labor cost of tearing out the old paving and special work and installing the new at the location where the work is done. "Handling" signifies the cost of loading the necessary materials at the various storage yards as well as the unloading of same at the place of renewal. It also includes the cost of transportation and the cost of removal of old or left-over material. Since the transportation is done by a subsidiary company, which adds profit and overhead expense to the net cost, this item may differ considerably from that obtained on other railways. Under "miscellaneous" are included the expense of city inspectors, expense incurred when portable crossovers are used for divergence of cars during renewal, watchmen's wages, and incidental engineering expense. The total of these three items —labor, handling and miscellaneous — therefore includes everything except the cost of materials.

On account of the unsettled labor conditions prevailing since the beginning of the war, the costs given are based on pre-war wages, the average track labor on which these costs are based is 20 cents per hour, including the foreman's wages.

## Storage Batteries Used for Lighting Manholes

In underground work, difficulty is necessarily experienced because of the lack of light. This is particularly true of manhole work where the only natural light obtainable comes through the entrance to the manhole from the street, and the limited amount of space is such that practically in every position a man is bound to obstruct his own light. Because of this fact a good electric light is essential and a portable light is often the most practical.

PORTABLE OUTFIT FOR LIGHTING MANHOLES

The electric portable lighting outfit shown in the illustration has been developed for this purpose. The set includes an Edison storage battery of five cells and two guarded 12-cp. lamps with reflectors and 11-ft. leads. One of these lamps can be used constantly for twenty hours on a completely charged battery and both of them will burn for ten hours.

The Edison storage battery is particularly adapted to this service because it can be allowed to stand idle indefinitely in any condition of charge or discharge without injury, and without care or attention. The complete outfit weighs 40 lb. The ampere-hour capacity is 37.5, and the normal charging rate for seven hours is 7.5 amp. at 9 volts.

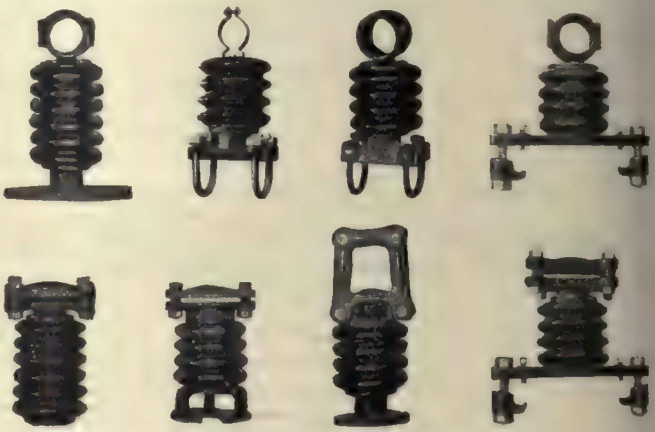
## Overhead Men Helped Sale

The accompanying engraving shows how the overhead men of the Wichita Railroad & Light Company, Wichita, Kan., "did their bit" by erecting display advertisements of the Liberty bonds, during the sale last June.

NEW USE FOR TROUBLE WAGON IN WICHITA, KAN.

## Busbar Supports Having Interchangeable Features

Busbar supports which can be quickly changed into the different types required to meet the local conditions which arise during installation are shown in the accompanying illustration. These supports have been developed by the Delta-Star Electric Company, Chicago, Ill., and since the parts are interchangeable and adjustable and it is possible to make such alterations as changing a flat base mounting to a pipe frame mounting. It is also a simple matter to accommodate a change in the size of busbars by removing the original fitting and installing a new one of a different type or size.

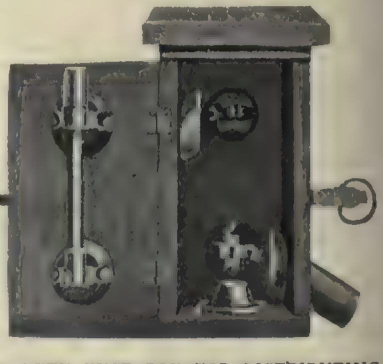


DIFFERENT TYPES OF ADJUSTABLE BUSBAR SUPPORTS

## Outdoor Fuse Box for Protection of Distributing Transformers

For housing the fuses which protect outdoor distributing transformers, a fuse box is made which embodies several important safety features. As will be seen from the illustration complete separation of the part to be handled from all live contacts is accomplished automatically by opening the door.

The fuse tube is open at the bottom and is provided with a closed expulsion chamber at the top. Upon the blowing of the fuse the gases are expelled from the bottom of the tube through a porcelain bushing in the bottom of the box. The gases expelled from the fuse tube puncture a piece of paper clamped under the box. This puncture can be seen by the inspector from the ground, and there is no necessity for his climbing the pole. No tools other than a screwdriver are necessary for the installation of boxes. They are supported by a strap hanger-iron screw to the crossarm, and the line lead and transformer lead enter the fuse box through extra heavy bushings in the side of the box. The complete outfit is made by the Westinghouse Electric & Manufacturing Company.



SAFETY FUSE BOX FOR DISTRIBUTING TRANSFORMERS

# News of Electric Railways

Traffic and Transportation

Financial and Corporate
Personal Mention
Construction News

## Strike Declared in San Francisco

### Men Walk Out Without Presenting Demands—Discontent Spread by New Men—City to Parallel Market Street Tracks

On Aug. 11 about 100 platform men of the United Railroads of San Francisco went out on strike, no cause being stated. Many of them abandoned their cars on the street. More men continued to leave their posts until by nightfall on Aug. 14 nearly all the lines of the system were seriously crippled, some being discontinued altogether. The strikers asserted that they had enrolled 1500 out of the total of 1850 platform men. A parade of strikers took place, as well as various other demonstrations, such as derailing cars and urging men to quit their posts, but the cases of violence or serious damage have been few. The company has been breaking in about 600 new men to replace those that will be lost by draft, and it is believed the discontent was begun and spread by these new men.

The Auto-Bus Operators' Union is assisting the strikers. The secretary of that body announced his intention to give all former platform men who could drive automobiles an opportunity to go into business operating jitneys, while the others would be offered a course of intensive training. His boast was that the present total of 500 jitneys could be doubled in forty-eight hours and increased to 2000 within a short time. In reply to this the Police Commission has stated that only 130 more buses could obtain licenses.

Up to the night of Aug. 14 no grievances had been presented, nor had the company been informed as to what the strikers were seeking. They stated, however, they would soon petition to have the working day reduced from ten hours to eight hours, and the pay raised to $3.50 a day, with time and a half for overtime. President Lilienthal, in an announcement to the public, expressed regret for the inconvenience caused, pointed out that in four years wages had been voluntarily raised three times, and cited the efforts the company had made in the form of insurance, personal loans and other fair and generous dealings with the men. He said in part:

"I know that those of our men recently employed came under certain outside influences and that at the present time such defection as is taking place is the result of physical intimidation. We must, of course, depend upon the public officers to preserve peace. But even if they do, the fear of violence, especially when applied to men of families, tends to frighten them off the cars." President Lilienthal also said that the men on strike were no longer in the employ of the company, and that they had left the service by what would seem to be their own voluntary act. The recent scale of voluntary wage increase was published in the ELECTRIC RAILWAY JOURNAL of July 21, page 117.

### CITY TO COMPETE ON MARKET STREET

The Board of Supervisors on Aug. 13 voted to lay municipal tracks on Market Street, paralleling the United Railroads' tracks now in service. It was decided to give the municipal cars the exclusive right to operate through the Twin Peaks tunnel. Construction is to be commenced as soon as possible, and municipal cars are to be operating from the ferry through the tunnel by the first of next year. It is pointed out that the most profitable franchises of the United Railroads have but twelve years to run, and that the city will lay plans to develop its system so as to be in a position to take over the private lines advantageously at that time. The compromise plan of the United Railroads for handling traffic on Market Street and through the tunnel, which was turned down by the city, was noted in the issues of July 14 and Aug. 11.

## Municipal Ownership Propaganda in Toledo

Plans are being perfected by the Central Labor Union and the Socialists at Toledo, Ohio, for a strong campaign in behalf of the proposed charter amendment providing for municipally-owned street railways. This will be submitted to the voters for approval at the primary election on Sept. 11. The campaign is to be started three weeks before the primaries, according to present plans.

The amendment would give power to the city to issue negotiable bonds and pledge the general credit of the city for the purchase of any public utility. In its terms it is general, but its specific purpose is to purchase the railway property of the Toledo Railways & Light Company. Should the amendment be approved, voters will be asked to authorize the city to issue $3,000,000 in bonds at the November election as the initial payment for the property. Half of this amount would stand against the credit of the city and the remainder would be a lien against the property.

In the event that both the charter amendment and the bond issue were approved, an expert would be employed to make a valuation of the property. The city's budget contains an item of $17,000 to pay an expert for this work.

Director of Law Harry Comminger, when asked in regard to this matter, expressed doubt as to whether such an amendment as this would be constitutional, although he said he had not made an investigation. President Johnson Thurston of the Street Railway Commission declined to express an opinion as to the probable effect of the municipal ownership program on the community plan which has been worked out by the commission and is now in the hands of Henry L. Doherty, chairman of the board of directors.

## Strike Settled in Butte

A strike which was begun on the lines of the Butte (Mont.) Electric Railway on Aug. 3 tied up all traffic from that date to the evening of Aug. 9. The company made no effort to operate cars. Jitneys and vehicles of all kinds were pressed into service.

The men insisted that the company must accept their terms as to increased wages without compromise, and the company demanded that the increased wage scale be based upon the copper market. The company's counter proposition to the men allowed 45 cents an hour for first-year men; 50 cents an hour for second, third, fourth and fifth year, and 53⅛ cents after five years of service, with time and a half for overtime after twelve hours, based on the price of copper at 20 cents a pound and over. An amount of 2½ cents an hour would be deducted when copper was below 20 cents; 5 cents when copper was below 18 cents, and an amount sufficient to bring back the old scale when copper was below 15 cents. The union demanded the elimination of the five-year clause, with 53⅛ cents an hour for the first year and 56¼ cents an hour for the second year and after, irrespective of the price of copper, with time and a half for work over ten hours.

The strike was settled at a conference on Aug. 8 between officials of the railway and its employees in the office of Mayor W. H. Maloney. Car service was resumed at 6 p. m. on Aug. 9. The conference agreed on a scale of wages of 47½ cents, 50 cents and 53⅛ cents an hour for men whose employment extended over a period of one, two and more years. The agreement also provides for time and a half for all work over eleven hours. This is a flat scale of wages, fixed independently of the fluctuations of the copper market, in accordance with the men's demands. The men will resume their old numbers and priority.

# B. R. T. Must Obey Order

## Supreme Court Justice Directs Company to Put 250 New Cars in Service—Company Seeks Injunction

Under an opinion given on Aug. 12 by Supreme Court Justice Samuel H. Ordway, the Brooklyn (N. Y.) Rapid Transit Company must obey the order of the Public Service Commission to put 250 new cars on its surface lines. Previous references to this case were made in the ELECTRIC RAILWAY JOURNAL of July 14 and July 28. The order of the commission was entered on Feb. 8.

Commissioner Travis H. Whitney says that the present decision will have a far-reaching effect in strengthening the powers of the commission. He is quoted as follows:

"The commission was convinced that the company should buy cars and so ordered. After the war situation developed critically, the commission pointed out in an opinion that the company might reapply, stating any new facts resulting from war conditions. Instead of doing so, the company obtained an *ex parte* writ of certiorari which held up the order. The Supreme Court now says that the company must come to the commission if the situation has changed."

The Brooklyn Rapid Transit Company on Aug. 14 notified the commission that it would apply to the United States District Court in Brooklyn for a federal injunction restraining the commission's order. In regard to this William L. Ransom, chief counsel for the commission, said:

"The commission has repeatedly made known its willingness to deal fairly with the company on the basis of any new facts disclosed by due application. The company does not want that. It has made no application based on any conditions due to the war. It is, rather, bent on further delay."

At a hearing before Judge Veeder in the Brooklyn Federal Court on the day set counsel for the company, in asking for a temporary restraining order, asserted that they had been denied a constitutional right of review based on "primitive justice." They stated that the commission had no right to order the purchase of cars, because no evidence of the need of the cars had been submitted, and that the Legislature had unconstitutionally withheld the right of review in giving power to the commission to enforce decisions affecting the liberty and property of a private or corporate person.

Judge Veeder declined to issue a temporary order, but he announced that he would order the case for Aug. 21 before a specially constituted court in Brooklyn, consisting of one United States Circuit Court judge and two District Court judges. At this time the argument of the company for an injunction will be heard.

This court, the first of its kind in the State, is to be organized under the federal statute which provides for two District Court judges and one Circuit Court judge to hear any application for an injunction against a State commission or against the Interstate Commerce Commission.

# Buffalo Arbitration Board Reports

The conductor whose discharge on June 1 brought about threat of a strike by the union men on the Buffalo, N. Y., lines of the International Railway, has been reinstated by the board of arbitration. The board's decision said that the conductor did violate the three-year agreement between the company and its men and the rules of the company by leaving his car without relief. Owing, however, to his previous good record during eight years of service, the board decided that he should be reinstated to his former position with full seniority rights. The threatened strike was noted in the ELECTRIC RAILWAY JOURNAL of July 28, and a résumé of the testimony before the arbitration board was given in the issue of Aug. 4.

Because of the success in the above-described case the union immediately demanded the reinstatement of another conductor who was discharged under similar circumstances. The case was referred to the same board of arbitration. After considering the case the board denied the union's request. The decision, which was unanimous, stated that this employee had repeatedly violated not only the agreement but also the rules to such an extent that nothing should be done except to sustain the company's action in dismissing him from the service.

The members of the board of arbitration were Bert L. Jones, vice-president and general manager Niagara Gorge Railway, Buffalo, N. Y., for the company; John B. Kolb, a motorman, for the union, and Frank X. Schwab, a wholesale liquor dealer, as third member of the board.

# Kansas City Strike Ends

## Company Refuses to Agree to Closed Shop—Federal Courts Issued Restraining Orders

The strike situation on the lines of the Kansas City (Mo.) Railways was cleared up on Thursday, Aug. 16, after a suspension of service since Wednesday, Aug. 8. The beginning of the strike, instigated by former employees and having as its declared object the adoption of a "closed shop," was described in last week's issue.

On Thursday, Aug. 16, a committee of business men passed a proposal and secured a vote of acceptance from the strikers. The company signed it and announced that cars would be run Friday morning. As will be noticed later, the proposal was practically the same as that made by the company on the Sunday before and rejected by the men. The settlement provides for the return of men out since Aug. 1, accredited committees from the various classes of employees, arbitration and no discrimination against union men. The strikers, it is understood, lost their fight for a "closed shop." The company's proposal for individual contracts was refused.

The public in Kansas City varied with regard to supporting one side or the other in the strike. The local unions were very radical in their support of the strikers. The press in general played into the hands of the strikers by exploiting the complaints against wages and conditions, playing up extraneous matters and putting the soft pedal on the demand for complete unionization. This misled a large portion of the public. Many, however, did not at all sympathize with the strikers. The business men tried to be neutral, although they almost universally favored the company's side of the case.

### PROGRESS OF THE STRIKE

Several hundred strikebreakers were brought to Kansas City on Saturday morning, Aug. 12, and four cars containing part of these were attacked by strike sympathizers, five of the latter and bystanders being injured. Early Saturday afternoon the mob attacked trucks bearing dishes and food for the strikebreakers and prevented food from reaching the men. In the evening the mob seized and burned a car that had stood under brakes near the carhouse. The mob then tried to set fire to the carhouse, but the fire department extinguished the blaze. About 10.30 p. m., after continuous rioting, the crowd prevailed on the strikebreakers to go to the Union Station, where they were loaded on cars and taken outside the city.

On Sunday night the company, after several conferences with city officials and strike leaders, proposed a settlement involving contracts of employment running to Sept. 1, 1921. The company would treat with duly acredited committees chosen by each class of employees, any non-adjustable case to be arbitrated. It was agreed that all employees who quit work on or subsequent to Aug. 7 should return to work, and that the men dismissed since Aug. 1 should be reinstated. The company, however, would not run a "closed shop," although union members would not be the object of discrimination. These proposals, it is said, were voted down by the men on the advice of the union leaders.

On Monday, Aug. 13, the strikers adopted the following resolution:

"The members of the new carmen's union, through their accredited representatives, notify the representatives of the street car company that we insist that upon a settlement of the difficulties and upon our return to work every employee who may now or hereafter be engaged by the Kansas City Railways shall become a member of the Amalgamated Association of Street & Electric Railway Employees of America, within thirty days."

Although the company had announced that cars would be operated on Monday, no effort was made to run them. The company was said to have more than 600 trainmen under pay at various carhouses, to work when the time came. These were trainmen who had remained loyal to the company, and trainmen formerly employed by this and other companies. The company issued a statement that in view of the disgraceful occurrences on Saturday night there would be no cars operated until police protection was furnished.

### RESTRAINING ORDERS GRANTED AGAINST STRIKERS

A restraining order against striking employees, city officials and any and all other agencies, preventing them from interfering with the company in the operation of its cars and the control of its Missouri property, was granted by Judge Martin J. Wade of the Federal Court on Tuesday, Aug. 14. A similar order was issued by Judge Woodrough for the Kansas property. These temporary injunctions were secured in time to prevent the throwing of the company into receivership through a State court.

This receivership move came about through the action of the City Council in appointing on Monday night a committee with representatives from both houses. The first act of this committee on Tuesday was to file an application for receivership against the protest of a committee of business men. The officials of the company were ordered to appear at 2 p. m. Before then, however, the federal restraining orders had been granted, and the hour was changed until Friday morning, Aug. 17, after the hearings on the orders.

Both houses of the City Council passed on Monday night an ordinance providing for licensing conductors and motormen, the fee, $1, to be paid once, license to be indeterminate as long as the trainman was employed in Kansas City. The ordinance has yet to be signed by the Mayor. Applicants would have to be twenty-one years of age, with at least twenty days' experience in operating in Kansas City. Special licenses were provided for in the case of new men, while receiving training for twenty days under licensed motormen and conductors. Fines of $100 to $500 were set for violations.

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## Tangled Situation in East Cleveland

In a referendum vote in East Cleveland on July 31, the franchise granted the Cleveland Railway by the City Council some time ago was defeated by a majority of 87. The vote was very small, and apparently there was little interest in the matter. Street Railway Commissioner Sanders said that the town had thrown away the best franchise that will ever be offered it. The present franchise on the Euclid Avenue line has three years to run, but the Hayden Avenue franchise expired some time ago.

The defeat of the franchise has caused a renewal of bickerings between the city and East Cleveland over the question of fares and service until a satisfactory arrangement can be made. Street Railway Commissioner Sanders, declaring that he is not taking steps to get even, stated that the suburb will now receive what is justly due it in service as defined in its franchise—one car every eight minutes, with a shuttle service on Hayden Avenue, where the franchise has expired. The fare on this short stretch of track between Euclid and St. Clair Avenues, he said, will be 3 cents, without transfers.

President J. J. Stanley of the company has made an announcement that work on relaying the tracks on Euclid Avenue will be begun within a few days and that the space between the tracks will be paved at the same time. This announcement was brought out by a statement of W. H. Kelly, president of the East Cleveland Chamber of Commerce, that the company would have to prove to the people that its contracts amount to something more than scraps of paper before they will approve any new ordinance. While the city paved its portion of Euclid Avenue last year, the company had not yet touched its space when the vote on the new franchise was recently taken.

In regard to the matter, President Stanley is quoted as follows:

"The railway has been generous to East Cleveland car riders by giving them better service than is required by the existing Euclid Avenue franchise. Under this contract the company is required to give but ten-minute service. Instead, cars operate over the line every one and a half minutes in rush hours, and a three-minute schedule is maintained from Windemere west and a six-minute service from Windemere east outside of the rush hours. The next ordinance which is accepted by the Cleveland Railway will not be on the terms offered in the rejected measure. There is no reason why East Cleveland people should ride any cheaper than citizens of other suburbs."

East Cleveland officials assert that the old franchise provides for an eight-minute service on Euclid Avenue and that the cars must loop past the Union Station in the city. This would disrupt the plan of turning all cars at the public square. It is said that if the company is going to enforce one part of the contract, the East Cleveland officials will probably be able to compel it to observe all the terms of the contract. At least, this is the threat of Mayor Minshall. The East Cleveland officials had been willing to suspend part of the contract so that the company's plan of routing might be carried out.

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## Peace Agreement at Lima

The strike among employees of the Ohio Electric Railway at Lima, Ohio, which was begun on July 11, was settled on Aug. 13 by agreement between the company and the men. The settlement, it is said, was hastened by the determination of the authorities to prevent a recurrence of the disorder that accompanied the attempt to resume service on Aug. 9. The agreement provides for changes in wages and working conditions, but not for union recognition.

The long strike trouble, as was noted briefly in last week's issue, developed into a riot on the evening of Aug. 9 and resulted in the serious injury of several persons. Eight men are now in jail on charges in connection with the riot.

After this Governor Cox notified the company that no cars should be operated in Lima until further notice. This became necessary because of the State's inability to give the local officials aid from the national guard, on account of its mobilization for federal purposes. E. W. Hines, a banker who was appointed director of safety on Aug. 9 to fill the unexpired term of Col. E. A. Gale, now in federal service, increased the police force and notified strikers and sympathizers against interfering with the operation of the cars. He called attention to the statute which makes such interference a penitentiary offense.

Aug. 13 was fixed as the day to resume operation, and the police department was to endeavor to prevent all trouble. Instead of another outbreak on this date, as was really expected by the city officials, a settlement was reached between the striking motormen and conductors and the Ohio Electric Railway. Both sides made concessions, but the company refused to recognize the union. As far as possible it was agreed to abolish split runs, and cars will be operated in such a manner as to give the men nine and one-half hours' work for ten hours' pay. The wage scale provides 25 cents an hour for the first year, and an increase of 1 cent an hour for each additional year's experience up to five years. Then the men are to receive 30 cents and the same thereafter.

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**Illinois Traction Increases Wages of Section Men.**—The Illinois Traction System, Peoria, Ill., has granted an increase of 25 cents a day to its section men, the wage now being $2.50 per day. The increase affects the entire system.

**Flag Printed on Stationery.**—The Grand Rapids, Grand Haven & Muskegon Railway, Grand Rapids, Mich., is printing on its stationery a colored representation of the American flag with the following words: "Our flag; a symbol of freedom, opportunity and civilization; long may it wave."

**New Wage Scale for Charlotte.**—Effective Aug. 1, the Southern Public Utilities Company, Charlotte, N. C., established a new wage scale for platform men, increasing the previous basis to the extent of 5.5 per cent. This is the second recent raise of this amount, a similar increase in the rate of pay for the motormen and conductors having been announced last fall.

**Springfield (Mo.) Men Reopen Strike.**—It is reported that a settlement of the three-week strike among employees of the Springfield (Mo.) Consolidated Railway was reached on Aug. 11, with an agreement regarding wages, retention of seniority rights and permissible union membership without full union recognition. The next day, it is said, the men repudiated their agreement and went out on strike again for full recognition of the union.

**Trenton Asks for Electrolysis Agreement.**—The city commission of Trenton, N. J., has asked the Trenton & Mercer County Traction Corporation, the New Jersey & Pennsylvania Traction Company and the Public Service Railway to enter into an agreement with the city for the mitigation of electrolysis evils in Trenton. The city asserts that it is put to considerable expense for replacing water services. One water main lasted only eight weeks.

**To Arbitrate Key Route Labor Trouble.**—Employees of the San Francisco-Oakland Terminal Railways on Aug. 6 voted, by a large majority, to strike unless the company granted them a wage increase. The grievance committee of the carmen's union, representing the employees, met with company officials on Aug. 8 and listened to a compromise offer made by the company. After a series of meetings both sides agreed to submit the matter to arbitration, and the procedure is now under way.

**Labor Men Oppose St. Louis Settlement.**—The proposed United Railways compromise, in which the city of St. Louis would become a partner with the electric railway corporation, was strongly condemned in a report made on Aug. 13 to the Central Trades & Labor Union by a specially appointed committee. The committee alleged that the plan would allow the company to dodge taxes and obtain franchises free, and recommended that the central trades oppose the measure that is now being considered by the Board of Aldermen.

**Cincinnati Company Carries Grade Crossing Case to Highest Court.**—An appeal to the United States Supreme Court will be taken by the Cincinnati Traction Company and the Cincinnati Street Railway in their case against the city of Cincinnati in relation to the Ludlow Avenue grade crossing elimination. The Ohio Supreme Court recently rendered a decision in which the city received a judgment for $61,220. The companies claim that the State law and the municipal ordinance providing for grade crossing eliminations are unconstitutional.

**Fare Reduction Refused to Outlying Annexed Village.**—In its desire for territory and increased population, Cleveland some years ago took in Euclid Village and the territory between the eastern limits of East Cleveland and the village, a stretch of several miles. The Cleveland Railway had been charging a fare of 8 cents to that territory and collecting 1 cent for transfers. Recently the City Council passed an ordinance fixing the fare at 6 cents, with 1 cent for transfers, but the company has refused to accept it. It holds that 6 cents is not sufficient to pay the cost of operation.

**Wages Increased at Bangor.**—A voluntary increase in the wages of conductors and motormen was announced on Aug. 14 by the Bangor Railway & Electric Company, Bangor, Me. By the new scale first and second-year men are to be paid 29 cents an hour, third and fourth-year men 30 cents, with 31 cents the fifth year and afterwards. The increase amounts to 4 cents an hour for all grades and gives the men 7.5 cents an hour advance over the rates of Jan. 1, 1917. Car house and construction men also receive an increase. The road is operated by non-union labor. The payroll increase this year will be about $25,000.

**Court Rules Against State Forcing Men to Work.**—The State case, brought in the name of the Washington Public Service Commission against the Tacoma Railway & Power Company, Tacoma, Wash., and 293 striking employees, was dismissed on Aug. 4 on an order received from Superior Judge Mitchell. The only pertinent issue determined was the sustaining of a demurrer filed by the strikers in regard to their being included as defendants. The court held they could not be forced to work in order to provide "the adequate service" sought by the State. The case was still on trial when the strike was settled by agreement between the company and men, as previously noted in these pages.

**St. Louis Company to Buy Coal for Employees.**—The United Railways, St. Louis, Mo., will purchase coal in large quantities and retail it at cost to its 5000 motormen, conductors and mechanics in an effort to cut the cost of living. This announcement was made in a general circular sent out to the men over the signature of President Richard McCulloch. Notices were also posted in the thirteen carhouses of the company. It is estimated by the officials that a saving of from 5 to 7 cents on a bushel of coal can be made by the employees. The coal is to be stored in the various carhouses and sent to the homes of the workmen by drays. Order blanks have been distributed to the foremen of the carhouses, and the operating employees will be requested to use them.

**Canada Plans to Acquire Railroad Systems.**—Plans of the government for nationalization of railroads in the Dominion of Canada on a larger scale were recently announced in Parliament by Sir Thomas White, finance minister. He declared that in addition to the government-owned InterColonial Railway in Eastern Canada, it is proposed to acquire the entire Canadian Northern Railway system of more than 9000 miles, of which 6000 miles are situated in the Western wheat belt. The minister said the company has a common share capital of $100,000,000, of which the government already owns $40,000,000. It is proposed now to purchase the remaining $60,000,000 of common stock from the private owners. The minister said also that the government contemplated the eventual acquisition of the Grand Trunk Pacific Railway.

**British and American Railways Compared.**—William R. Pomerene, attorney Columbus Railway, Power & Light Company, read a paper before the Kit-Kat Club in Columbus on April 5, entitled "Trams and Trolleys," comparing British and American practice and giving other interesting information in regard to electric railways. The paper has recently been reprinted in pamphlet form. The comparison made was in part as regards general conditions and in part in detail as to the wages paid, fares charged, etc., between Glasgow and Columbus. Mr. Pomerene also referred to the history of American electric railways, including the history of franchises, and pointed out that the original ieda of a fixed fare to last for the greater part of a generation is bound to be unreasonable and unjust to one or the other of the contracting parties. No city, he says, would enter into a contract for twenty-five years to buy all of its coal at a fixed price per ton, nor would a coal operator be willing to furnish his bond to supply all the coal which might be asked within that period at a fixed price. He quoted a number of examples to show that in other lines of business a fixed price, such as many railway franchises provide for the charge for transportation, is likely to be unsatisfactory.

## Program of Association Meeting

### National Business Men's Convention

An emergency call has gone forth from the Chamber of Commerce of the United States to the business men of the country for a war convention to be held at Atlantic City on Sept. 17-21. It is expected to be the largest gathering of business men ever held. A principal topic of discussion will be the question of how business may render greater service in winning the war. This will include, for example, what may be done to control prices, and how greater efficiency in land and water transportation shall be developed. Moreover, there will be discussed the questions of how the nation shall provide for business enterprises not essential to the nation in war time, the special importance of food conservation to business men, industrial relations and employment problems, and foreign trade, banking and credit in war time. Of particular interest will be the subject of the readjustment after the war. This will include the question as to what will be the course of prices on raw materials and finished products after the war, how the nation shall plan for replacing its men in industry after they return from the war, and what new responsibilities in international relations may be expected after the war.

# Financial and Corporate

## Annual Report

### Philadelphia Rapid Transit Company

The comparative income statement of the Philadelphia (Pa.) Rapid Transit Company for the fiscal years ended June 30, 1916 and 1917, follows:

| | 1917 | | 1916 | |
|---|---|---|---|---|
| | Amount | Per Cent | Amount | Per Cent |
| Earnings: | | | | |
| Gross passenger earnings | $27,504,040 | 96.32 | $24,871,254 | 96.21 |
| Receipts from other sources | 1,049,574 | 3.68 | 968,088 | 3.79 |
| Total earnings | $28,553,614 | 100.00 | $25,839,344 | 100.00 |
| Expenses: | | | | |
| Maintenance and renewals: | | | | |
| Maintenance | $2,712,121 | 9.50 | $2,506,731 | 9.70 |
| Reserve fund for renewals | 1,570,921 | 5.50 | 1,369,170 | 5.30 |
| Total appropriation | $4,283,042 | 15.00 | $3,875,901 | 15.00 |
| Operation of power plant | 1,694,151 | 5.93 | 1,441,421 | 5.58 |
| Operation of cars | 7,129,739 | 24.97 | 6,447,078 | 24.95 |
| General | 1,498,826 | 5.25 | 1,343,326 | 5.20 |
| Taxes | 1,398,412 | 4.90 | 1,264,701 | 4.89 |
| Total expenses | $16,004,171 | 56.05 | $14,372,427 | 55.62 |
| Net earnings from operation | $12,549,443 | 43.95 | $11,466,916 | 44.38 |
| Fixed charges: | | | | |
| Interest | $2,280,179 | 7.99 | $2,308,779 | 8.94 |
| Rentals | 7,365,393 | 25.79 | 7,365,433 | 28.51 |
| Sinking fund, city contract | 120,000 | 0.42 | 120,000 | 0.46 |
| Total | $9,765,573 | 34.20 | $9,794,212 | 37.91 |
| Surplus | $2,783,870 | 9.75 | $1,672,704 | 6.47 |

The gross earnings during the year ended June 30, 1917, showed a gain of $2,714,270 or 10.5 per cent over those of the preceding year. This arose from an increase of 10.59 per cent in passenger earnings and 8.42 per cent in receipts from other sources.

The operating expenses, excluding taxes, showed an increase of $1,498,031 or 11.4 per cent. Of this total $986,353 was represented by larger appropriations for maintenance and renewals and to the company's wage fund, which is based on 22 per cent of the earnings. The taxes increased $133,711 or 10.6 per cent. The net earnings from operation, however, gained $1,082,527 or 9.4 per cent.

The fixed charges showed a net decrease of $28,639, owing to the saving in interest charges on account of car trust certificates paid off and the retirement of other capital obligations through the operation of sinking funds during the year. The resultant surplus for 1917 was $2,783,870 as compared to $1,672,704 for the preceding year.

The last fiscal year saw the beginning of the payment of dividends upon the company's capital stock of about $30,000,000. From the surplus earnings for the year ended June 30, 1916, there was paid on Oct. 11, 1916, a dividend of 2 per cent or $599,011, and for the last fiscal year there were paid on Jan. 31, 1917, a dividend of 2.5 per cent or $749,638, and on July 31, 1917, the same amount.

The capital account for "leases, franchises, construction, equipment, advances to leased lines, sinking funds, etc.," on June 30, 1917, amounted to $113,096,797, an increase of $115,650 for the year. This resulted from increases of $386,599 for additions and betterments and $378,540 for sinking fund payments and accretions, offset partly by sinking fund expenditures of $349,000 and the writing off of a proportion of near-side cars against renewals at $512,000, but helped by adjustments of $394,158 for underlying company property for prior years.

The company's renewal fund as of June 30, 1917, amounted to $2,525,000, of which $1,523,321 is in cash and the balance in securities. This fund is maintained for the purpose of having cash and liquid assets available for the financing of renewal expenditures as made from the accumulated unexpended balance of the 15 per cent appropriation of earnings for maintenance-renewal reserve.

## Rock Island Collateral to Be Sold

The principal and interest due on June 1, 1917, on the $266,000 of collateral trust notes of the Rock Island Southern Railway, Rock Island, Ill., remain unpaid. The City Trust Company, Buffalo, N. Y., as trustee has given notice that it will soon sell at auction in Buffalo the collateral, consisting of $532,000 first mortgage 5's, due Jan. 1, 1947.

The protective committee for these notes includes Arthur L. Chambers of A. L. Chambers & Company, investment securities, Buffalo; George F. Sowerby and Henry O. Smith, acting under agreement dated June 2, 1917, with the City Trust Company, Buffalo, as depositary; Moot, Sprague, Brownell & Marcy, as attorneys, and S. Fay Carr, counsel.

The deposit agreement dated June 2, 1917, empowers the committee, in case it becomes the purchaser of the bonds, and provided the interest due on the notes on June 1, 1917, is fully paid, to grant an option on the $532,000 bonds at not less than 50 per cent of their par value, plus such premium as the committee shall determine, until June 1, 1920, presumably to the controlling company, the Mississippi Valley Railway & Power Company, and to postpone the payment of interest on the bonds for a period not exceeding three years on such conditions as the committee may determine.

The coupons due July 1, 1917, on the first and refunding mortgage bonds of the Mississippi Valley Railway & Power Company are also in default. As noted elsewhere this week, the plan for funding six coupons thereon was recently authorized by the directors of the company to assist in financing the Rock Island Southern Railway.

## Mississippi Valley Adjustment

### Plan for Readjusting Finances Without Assessment—Bondholders to Fund Three Years' Interest

Under the plan of readjustment of the Rock Island Southern Railway, noted in this journal in 1915 and 1916, an issue of $300,000 of prior lien 5 per cent bonds was created by the new holding company, the Mississippi Valley Railway & Power Company, for its corporate purposes and for the rebuilding and rehabilitation of the Rock Island Southern property. A portion of these bonds has been sold and a portion deposited as collateral to raise money for carrying out the plan of readjustment and the payment of interest upon Mississippi Valley Railway & Power Company bonds. The sum of at least $150,000 must be provided for rehabilitation and rebuilding of the Rock Island Southern Railway property. In the present unsettled condition of the bond market, and under the present operating conditions of the Rock Island Southern Railway property, it has been deemed inadvisable to sell the balance of the prior lien bonds in the treasury to raise this rebuilding fund of $150,000. Instead of selling such bonds, it has been deemed more wise to waive interest upon the bonds of the Mississippi Valley company, as well as the interest upon the Rock Island Southern bonds.

Agreements have been made with the holders of more than $500,000 of Rock Island Southern bonds which are not on deposit under the plan of readjustment, and therefore not owned by the Mississippi Valley company, granting an extension of the time of payment of interest upon their bonds for three years, provided the Mississippi Valley company, as owner of the majority in amount of Rock Island Southern bonds, also withholds its interest. If interest is not paid by the Rock Island Southern upon its bonds, the Mississippi Valley company is without sufficient funds to pay the interest upon its own bonds. The plan adopted, therefore, is to request Mississippi Valley bondholders to exchange the coupons upon Mississippi Valley bonds for the three years beginning July 1, 1917, and receive therefor Mississippi Valley bonds, par for par.

Assenting bondholders of the Mississippi Valley company are accordingly asked to send their coupons maturing from July 1, 1917, to and including Jan. 1, 1920, to the company at Rock Island, or to the Central Trust & Savings Bank of Rock Island. There are outstanding about $175,000 of the $300,000 authorized prior lien 5s of 1915 of the Mississippi Valley company, and the interest thereon is being paid promptly, while coupons due July 1, 1917, on about $800,000 of outstanding first and refunding mortgage 5s remain unpaid. The $532,000 of first mortgage 5 per cent gold bonds (dated 1908 and due Jan. 1, 1947) of the Rock Island Southern Railway, which were not acquired by the Mississippi Valley company and which will have three years' coupons funded, are pledged to secure an issue of $266,000 of collateral notes of the Rock Island Southern Railway. This note issue is now being foreclosed, as noted elsewhere this week.

Explaining the situation, G. W. Quackenbush, assistant general manager, says:

"Funds are required for immediate disbursement for track betterments, new railroad ties, additional rolling stock, repairs to roundhouse, and other improvements to the property. Either an extension of tracks should be made into the business district of Rock Island to connect with the bridge line cars to and from Davenport, or a passenger depot should be built at the present terminal. New passenger cars are required or radical improvement to the present cars.

"The present net revenue of the Rock Island Southern Railway is approximately $50,000 per year. An increase in passenger rates of 20 per cent passed into effect on June 22, 1917, and an increase in freight rates is pending. These increases will probably take care of the increased cost of operation due to higher prices for coal and other operating material, so that the net revenue of the property for the next three years should not be less than the present net revenue. The extension proposed to the center of the business district of Rock Island, together with the improvements in the physical condition of the road and equipment, should increase the revenue and decrease the expenses of operation."

## Dispute Over Paving in Seattle

### Judge Dismisses City's Suit Pending Decision by Public Service Commission in Similar Case

The application of the city of Seattle, Wash., for a writ of mandamus to force the Puget Sound Traction, Light & Power Company to pave the space between its tracks with the same material as was used by the city in paving the rest of the street was denied recently by Judge Kenneth Mackintosh, after he had held it under advisement since March 26. The decision was in memorandum form, and directed attention to the fact that a suit involving the same parties and the same subject matter was before another tribunal of co-ordinate jurisdiction—Public Service Commission. Until the Public Service Commission makes a definite decision, and a final hearing is had in the Supreme Court, Judge Mackintosh will not enter the proceeding to make any ruling in the case.

The application which was submitted by Corporation Counsel Hugh M. Caldwell alleged that the company's action was a violation of its franchise obligations. The answer of the company set up that it had before the Public Service Commission a petition in which it asked to be relieved of paving between tracks whenever the city of Seattle improved the street.

Judge Mackintosh explained that he had not disclaimed jurisdiction, and indicated that he would be willing to entertain another application should the Public Service Commission decline to pass upon the case. Judge Mackintosh's action in recognizing the jurisdiction of the Public Service Commission is in contrast with the attitude of the City Council in forbidding the company to operate one-man cars on certain lines despite the permission granted by the Public Service Commission to operate such cars on those lines.

Corporation Counsel Caldwell of Seattle has now petitioned the Public Service Commission to dismiss the case of the company, in which the latter asks relief from its street paving franchise obligation. It is expected the company will resist the dismissal. A similar petition to disregard franchise requirements by the company was dismissed by the commission several months ago. At that time the commission declined to assume jurisdiction over anything pertaining to street railway operation except rates and public safety.

**Auburn & Syracuse Electric Railroad, Syracuse, N. Y.**—Five-year 6 per cent gold notes to the amount of $60,000 were paid off on Aug. 1 by the Auburn & Syracuse Electric Railroad at the office of the Trust & Deposit Company, Syracuse, N. Y.

**Columbia & Montour Electric Railway, Bloomsburg, Pa.**—Judge Evans in the Federal Court at Bloomsburg on Aug. 7 directed the bondholders of the Columbia & Montour Electric Railway to foreclose. The property consists of about 18 miles of line merged several years ago into the North Branch Transit Company, which also took over the Danville & Bloomsburg Electric line. A receiver has handled the affairs of the holding company for about a year. The equipment and rolling stock of the Danville & Bloomsburg line, it is said, have been used on the Columbia & Montour line. The generating plant of the former lies dismantled and abandoned.

**Columbus Railway, Power & Light Company, Columbus, Ohio.**—E. W. Clark & Company, Philadelphia, are offering an additional block of first refunding and extension sinking fund mortgage 5 per cent gold bonds of 1915 of the Columbus Railway, Power & Light Company. The total amount of this issue of mortgage bonds outstanding is $4,500,000 at the present time.

**Gary & Interurban Railroad, Gary, Ind.**—The Federal Court at Valparaiso, Ind., has ordered a foreclosure sale of the following subsidiaries of the Gary & Interurban Railroad: The Valparaiso & Northern Railroad and the Gary Connecting Railways, to be sold on Sept. 18, upset prices $40,000 and $50,000 respectively. The Gary and the East Chicago divisions will also be sold on this date at an aggregate upset price of $200,000, and the Laporte division for not less than $75,000.

**International Railway, Buffalo, N. Y.**—Because of its inability to dispose of $1,175,000 of 5 per cent refunding and improvement mortgage bonds at a price not less than 89 per cent of their face value, for the issuance of which the International Railway received authority on July 11, 1916, from the Public Service Commission for the Second District of New York, the company recently filed a petition to put these bonds on the market at not less than 85. The petition has been granted. The proceeds of the bond sale are to be used for the extension of the company's new Buffalo-Niagara Falls double-track line.

**Mansfield Railway, Light & Power Company, Mansfield, Ohio.**—Doherty interests, through the Mansfield Electric Light & Power Company, have secured control of the Mansfield Railway, Light & Power Company, which operates the street railway lines at Mansfield and the Mansfield-Shelby interurban line. This company also owns the lighting franchise in Mansfield. It is said that negotiations for this property have been under way for some time.

**New Orleans Railway & Light Company, New Orleans, La.**—Simon Borg & Company, New York, have lost the legal fight in the Federal Court in New Orleans to have a receiver appointed and permanent writ of injunction issued to prevent consolidation of the New Orleans City Railroad with the New Orleans Railway & Light Company. The banking company filed suit on May 22, 1916, and the court issued a temporary writ holding up the amalgamation until evidence could be presented. The New Orleans City Railroad has been operated under lease by the New Orleans Railway & Light Company.

**Norton, Taunton & Attleboro Street Railway, Norton, Mass.**—The Massachusetts Public Service Commission has approved the issuance of 1200 shares of new capital stock, at par, by the Norton, Taunton & Attleboro Street Railway. This corporation was organized to own and operate the Norton & Taunton Street Railway, purchased at receiver's sale, the amount of capital stock being approved by the commission as not exceeding the fair replacement cost of the property. The new stock issue is to be used to pay for improvements.

**Ohio Service Company, Cambridge, Ohio.**—The Ohio Service Company has applied to the Ohio Public Utilities Commission for authority to issue $120,000 of three-year 6 per cent convertible trust notes. The amount now outstanding is $1,301,000.

**Reading Transit & Light Company, Reading, Pa.**—William P. Bonbright & Company, New York, have announced the sale, at 98½ and interest, of the new issue of $2,300,000 of two-year 6 per cent secured gold notes of the Reading Transit & Light Company, dated Aug. 1, 1917. A previous note regarding this issue was published in the ELECTRIC RAILWAY JOURNAL of Aug. 11.

**Tri-City Railway of Illinois, Rock Island, Ill.**—At a recent special meeting of stockholders of the Tri-City Railway of Illinois it was unanimously voted to increase the capital stock by $500,000 to a total of $3,500,000.

**West Virginia Traction & Electric Company, Wheeling, W. Va.**—William P. Bonbright & Company, New York, have announced the sale, at a subscription price of 98½ and interest, yielding 6¾ per cent, of an issue of $1,800,000 of two-year 6 per cent bond-secured gold notes of the West Virginia Traction & Electric Company, dated May 1, 1917, and due May 1, 1918, but callable at 100½ and interest on forty days' notice. Previous items regarding this underwriting were published in the ELECTRIC RAILWAY JOURNAL of May 5 and May 26.

## Electric Railway Monthly Earnings

| Period | Operating Revenue | Operating Expenses | Operating Income | Fixed Charges | Net Income |
|---|---|---|---|---|---|
| **AURORA, ELGIN & CHICAGO RAILROAD, AURORA, ILL.** | | | | | |
| 1m., June, '17 | $186,330 | *$137,513 | $48,817 | $35,800 | $13,016 |
| 1 " " '16 | 177,844 | *113,729 | 64,115 | 36,053 | 28,061 |
| 6 " " '17 | 998,088 | *741,590 | 256,498 | 214,594 | 41,903 |
| 6 " " '16 | 946,832 | *641,567 | 305,265 | 218,509 | 86,756 |
| **BANGOR RAILWAY & ELECTRIC COMPANY, BANGOR, ME.** | | | | | |
| 1m., June, '17 | $65,662 | *$40,422 | $25,240 | $18,738 | $6,502 |
| 1 " " '16 | 64,368 | *39,263 | 25,105 | 17,586 | 7,519 |
| 12 " " '17 | 862,877 | *488,713 | 374,164 | 221,471 | 152,693 |
| 12 " " '16 | 800,890 | *431,849 | 369,041 | 211,409 | 157,632 |
| **CHATTANOOGA RAILWAY & LIGHT COMPANY, CHATTANOOGA, TENN.** | | | | | |
| 1m., June, '17 | $128,805 | *$81,223 | $47,582 | $29,628 | $17,954 |
| 1 " " '16 | 102,680 | *63,375 | 39,305 | 29,992 | 9,313 |
| 12 " " '17 | 1,301,091 | *907,416 | 393,675 | 357,675 | 36,000 |
| 12 " " '16 | 1,182,352 | *748,054 | 434,298 | 357,341 | 76,957 |
| **COLUMBUS RAILWAY, POWER & LIGHT COMPANY, COLUMBUS, OHIO** | | | | | |
| 1m., June, '17 | $311,975 | *$236,732 | $75,243 | $47,019 | $28,224 |
| 1 " " '16 | 280,350 | *160,497 | 119,853 | 42,875 | 76,978 |
| 12 " " '17 | 3,747,491 | *2,474,273 | 1,273,218 | 531,282 | 741,936 |
| 12 " " '16 | 3,307,057 | *1,934,061 | 1,372,996 | 501,734 | 871,262 |
| **COMMONWEALTH POWER, RAILWAY & LIGHT COMPANY, GRAND RAPIDS, MICH.** | | | | | |
| 1m., June, '17 | $1,550,770 | *$955,369 | $595,401 | $427,519 | $167,882 |
| 1 " " '16 | 1,322,295 | *742,346 | 579,949 | 419,968 | 159,981 |
| 12 " " '17 | 18,147,509 | *10,580,010 | 7,567,499 | 5,111,143 | 2,456,356 |
| 12 " " '16 | 15,841,539 | *8,445,477 | 7,396,062 | 4,847,814 | 2,548,248 |
| **CUMBERLAND COUNTY POWER & LIGHT COMPANY, PORTLAND, ME.** | | | | | |
| 1m., June, '17 | $244,435 | *$175,843 | $68,592 | $68,465 | $127 |
| 1 " " '16 | 242,379 | *147,443 | 94,936 | 66,736 | 28,200 |
| 12 " " '17 | 2,975,271 | *1,960,379 | 1,014,892 | 814,160 | 200,732 |
| 12 " " '16 | 2,759,843 | *1,634,506 | 1,125,337 | 789,862 | 335,475 |
| **EAST ST. LOUIS & SUBURBAN COMPANY, EAST ST. LOUIS, ILL.** | | | | | |
| 1m., June, '17 | $296,753 | *$198,621 | $98,132 | $64,598 | $33,534 |
| 1 " " '16 | 244,082 | *142,965 | 101,117 | 62,714 | 38,403 |
| 12 " " '17 | 3,362,412 | *2,106,159 | 1,256,253 | 767 220 | 489,033 |
| 12 " " '16 | 2,702,763 | *1,612,650 | 1,090,113 | 752,601 | 337,512 |
| **GRAND RAPIDS (MICH.) RAILWAY** | | | | | |
| 1m., June, '17 | $104,828 | *$72,133 | $32,695 | $18,972 | $13,723 |
| 1 " " '16 | 108,702 | *72,645 | 36,057 | 13,036 | 23,021 |
| 12 " " '17 | 1,303,090 | *865,153 | 437,937 | 211,141 | 226,796 |
| 12 " " '16 | 1,255,468 | *834,096 | 421,372 | 166,667 | 254,705 |
| **LEWISTON, AUGUSTA & WATERVILLE STREET RAILWAY, LEWISTON, ME.** | | | | | |
| 1m., June, '17 | $75,669 | *$56,652 | $19,017 | $15,678 | $3,339 |
| 1 " " '16 | 72,030 | *43,039 | 28,991 | 16,094 | 12,897 |
| 12 " " '17 | 846,133 | *626,273 | 219,860 | 184,686 | 35,174 |
| 12 " " '16 | 763,749 | *502,356 | 261,393 | 192,253 | 69,140 |
| **NASHVILLE RAILWAY & LIGHT COMPANY, NASHVILLE, TENN.** | | | | | |
| 1m., June, '17 | $194,493 | *$126,143 | $68,350 | $40,321 | $28,029 |
| 1 " " '16 | 190,109 | *123,400 | 66,709 | 42,512 | 24,197 |
| 12 " " '17 | 2,431,587 | *1,529,333 | 902,254 | 496,976 | 405,278 |
| 12 " " '16 | 2,251,525 | *1,393,930 | 857,595 | 515,237 | 342,358 |
| **PORTLAND RAILWAY, LIGHT & POWER COMPANY, PORTLAND, ORE.** | | | | | |
| 1m., June, '17 | $490,652 | *$275,098 | $215,554 | $176,699 | $38,855 |
| 1 " " '16 | 473,664 | *262,100 | 211,564 | 181,032 | 30,532 |
| 12 " " '17 | 5,664,193 | *3,070,129 | 2,594,064 | 2,173,776 | 420,288 |
| 12 " " '16 | 5,456,967 | *3,074,746 | 2,382,221 | 2,192,060 | 190,161 |

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*Includes taxes.

# Traffic and Transportation

## Fare Increases Considered

### Several Doherty Companies, Feeling Assured of Consent of Public Service Commissions, Will Probably Raise Fares

The greatly increased costs of operation, due to the war, have made it imperative for several of the properties operated by the Doherty Operating Company, New York, to consider increasing fares. R. F. Carbutt, in charge of the Doherty railway companies, is arranging with the managers of the traction companies to see what readjustment of fares can be made.

At a recent meeting of the executives at the New York office Mr. Carbutt reported that as changes in rates will probably be universal, there would be little opposition encountered on the part of the public utility commissions in the various states in which the Doherty traction companies do business. He said that as the increases to be asked for were directly based upon greatly advanced costs of operation which could easily be shown, the public service commissions would be convinced of the justice of the traction companies' demands. Already several rate changes have been made on Doherty properties, and arrangements are being made to adjust matters for all the traction companies.

The abolition of the sale of six tickets for 25 cents, a system which is in operation on some Doherty roads, will probably be the first step taken. In fact, one Doherty property has already abolished the six for a quarter idea. Not all the traction companies are decided as to what method to adopt in raising fares.

## California Road Asks Rate Increase

### Higher Costs and Large Portion of Business Taken by Automobiles Are the Reasons Given

The Petaluma & Santa Rosa Railway, Petaluma, Cal., which operates between Petaluma and Sebastopol and from Forestville to Santa Rosa and has steamers running between Petaluma and San Francisco, has filed with the Railroad Commission of California an application for authority to raise its passenger fares and freight rates. The company says that, while its net operating revenue for 1916 showed a return of 4.12 per cent on the value of its property as fixed by the Railroad Commission, if it had spent the sum needed for betterments the net return would not have been more than 3 per cent. It cites the fact that when the present rates were established it cost the company $36,000 for labor and fuel to operate two steamers, while now the cost is $60,000 a year, with prospect for further increases. The company says that it pays $1.05 a barrel for fuel oil, but that its contract at this price will expire the first of next year and then it will be fortunate to secure fuel oil even at a 50 per cent increase. The company figures that the gross increase in revenue resulting from the changes requested will be about $30,000. It avers that its present income is not sufficient to meet operating expenses and interest on outstanding obligations and to maintain properly its service and the property.

The fares and rates now sought to be changed, according to the company's statement, were established under competitive conditions so as to invite an increased population. The company has met its operating expenses and fixed charges by assessing $10 a share on its stockholders and by rigid economy. Land along the property has increased in value since the road was constructed from $75 and $100 an acre to $500 and $1,000, but automobiles and the steadily increasing cost of labor and material have prevented the net revenue from keeping pace with this development. The company wants to spend $250,000 within the next five years for additions, replacements and improvements.

## Grade-Crossing Order Issued

### Gates at Nearly 150 Crossings to Be Kept Down During Early Morning Hours by Order of New York Commission

The Public Service Commission for the First District of New York, on a motion made by Commissioner Charles S. Hervey, has issued an order directing the New York Central Railroad, the Long Island Railroad and the Staten Island Rapid Transit Railway to keep the gates at 143 grade crossings lowered from midnight until 5 a. m. as a measure of protection to vehicle traffic. The order specifies also that gates at two of the crossings on the Staten Island Railway, which is operated by the last-named road, be kept closed between 2 a. m. and 5 a. m.

A hearing held on the matter on June 6 was reviewed in the Electric Railway Journal for June 9, page 1072. Preliminary to that hearing an investigation had been made by the commission and data collected on the use made by vehicles and pedestrians of the principal crossings between the hours in question. The police department indorsed the plan and at the request of the commission made an additional investigation of all the 145 crossings, after which it recommended the list of crossings which should come under the commission's order.

The order takes effect on Aug. 22 and will remain in force for one year, unless abrogated in the meantime by the commission. All of the railroads involved are said to be in favor of the plan. In his opinion, Commissioner Hervey said that the crossing gates were not a sufficient safeguard to the public on account of negligent watchmen. The inspections disclosed that watchmen were frequently asleep during the early morning hours. Time clocks, to be punched at half-hour intervals, were tried out at certain crossings, but some gatemen found means of evading the scheme. Even thorough inspection by roundsmen had not proved altogether successful. The installation of signal semaphores to give a stop indication when the gates were up, had also been considered.

## Bay State to Modify Special Rates

The Bay State Street Railway, Boston, has filed with the Public Service Commission of Massachusetts a schedule of changes to be made in reduced-rate workingmen's commutation and excursion tickets. This was to be effective on Aug. 16, but the commission has suspended its operation until Oct. 1, pending a public hearing or investigation. Some of the tickets are to be withdrawn, and others formerly sold at twenty rides for $1.40 are increased to $1 92. Others formerly sold at ten rides for 50 cents are increased proportionately. Excursion tickets on the Quincy, Taunton and Brockton divisions are provisionally withdrawn in the new tariff. The commission in its suspending order stated that, in its opinion, the changes might seriously affect the rights and interests of the public.

## Wreck on Shore Line

### Nearly a Score Killed in Collision Caused by Failure of Car to Take Siding

A head-on collision between two interurban cars of the Shore Line Electric Railway, Norwich, Conn., occurred late in the afternoon of Aug. 13. The accident happened near North Branford, about 12 miles from New Haven. The cars, it is said, were running at about 35 miles an hour, and as a result of the impact nineteen persons were killed and between forty and fifty seriously injured.

Evidence given by the car men and by passengers places the blame for the accident upon the crew of the westbound car, which should have waited on a siding about a half mile from the spot where the accident occurred. No specific reason was stated as to why the car had not sidetracked to wait for the eastbound car. After the accident the crew of the westbound car are said to have stated that they were sleepy on account of working overtime. The motorman escaped serious injury by jumping when he saw the collision was inevitable.

## Six-Cent Fare Denied

The Rhode Island Public Service Commission on Aug. 14 denied the petition of the Bay State Street Railway, Boston, Mass., to be allowed to charge a 6-cent fare on its lines in Rhode Island. The commission ordered the company to establish an additional 5-cent fare zone in Portsmouth which, it held, will give considerable relief and should be given a fair trial before the 6-cent fare is considered. This will increase the through fare from Newport to the Massachusetts State line from 15 cents to 20 cents and the rate per mile will be 1.35 cents.

In its decision the commission stated that, although it had in mind the needs of electric railways during the present period of high prices, not enough evidence had been produced to prove that a 1-cent increase in the fares in Newport would not be unreasonable. It was evident to the commission that the company is not earning a reasonable return from its lines between Newport and the Massachusetts State line. The present establishment of fare zones seems to result in a preference to the town of Portsmouth. It was to remedy this that another fare zone was ordered and also in order to increase the rate paid by the through passenger.

## Fare Reduction Considered in Buffalo

An appraisal of the physical properties of the International Railway, within the city of Buffalo, N. Y., is now being made by the municipal authorities in connection with the city's efforts to have the Public Service Commission order a reduction in fare from 5 cents to 4 cents. George E. Pierce, city attorney and acting corporation counsel, attended hearings in Albany on the application of several railways for permission to increase their fares from 5 to 6 cents, and facts elicited there before the Public Service Commission for the Second District are to be used by the city in its action. The International Railway, through Thomas Penney, vice-president and general counsel, has questioned the authority of the commission in the matter of making rates and this question must be settled before hearings are held on the city's application. The municipal authorities contend that the earnings of the company are sufficient to warrant a reduction in the rate of fare charged on its Buffalo city lines.

## Skip Stop Introduced in Toledo

### Scheme Is Being Tried Out on One Line—Outlook for Success Favorable

The Toledo Railways & Light Company, Toledo, Ohio, began skip-stop operation on Aug. 13 on its Cherry-Union Depot line in that city. The company had talked for several years of introducing the skip stop in Toledo, but no definite action was taken, due mainly to numerous objections which were made. During the last month several conferences were held with the city officials and a plan was agreed upon by which this form of express service was started on the Cherry Street line. This line is the busiest and one of the longest in the city. The schedule under the old arrangement provided for a one-way trip of forty-four minutes. The time of the run is reduced to thirty-six minutes under the skip-stop plan. It is thought possible by the company that this saving of time can be increased. The distance between stops under the old system was 510 ft. outbound, while under skip-stop operation it is 670 ft. Inbound cars stop 775 ft. apart now, instead of 550 ft. as formerly.

Previous to the introduction of the new system the company ran a set of posters informing the public of its intention to introduce the skip-stop. This was followed by two other posters, which pointed out the benefits of the plan. A final announcement called attention to the effective date of the change and also instructed patrons to look for white circles on poles at stop corners. Advertisements describing the new service were also run in the local papers.

Only a few objections to the plan as started have thus far been received. If the system proves a success upon the initial line it is the intention of the company to start it on the remainder of the system wherever practicable.

**Electric Heaters for Calgary Cars.**—Arrangements are being made to install electric heaters in the cars of the Calgary (Alta.) Municipal Railway for use during early-morning and evening hours in the spring and fall. The coal stoves will be retained and both systems will be used in the extreme cold weather.

**Free-Transportation Privilege Withdrawn.** — The Quincy (Ill.) Railway, a part of the Illinois Traction System, has rescinded its order, made some time ago, which allowed men in the government service free transportation. The great increase in the number of uniformed men in the district was said to be the reason for the action.

**Trade in Ticket Books Made Unlawful.**—A bill passed recently by the California State Legislature makes it unlawful to sell a railway ticket or commutation book to a second person not entitled to its use. The law states that any one who resells any instrument for passage on a common carrier shall be guilty of a misdemeanor.

**Illuminated Car Numerals in Indianapolis.**—Monitor-deck and side signs on the Virginia Avenue cars of the Indianapolis Traction & Terminal Company, Indianapolis, Ind., have been dispensed with and in the future the cars will be designated by illuminated numerals only. If the new system is successful on the south side line, cars of the entire Indianapolis railway system will be so numbered eventually.

**Portland Employees Have Outing.**—The employees and officials of the Portland Railway, Light & Power Company, Portland, Ore., with their families, on Aug. 8 enjoyed their annual picnic at Estacada. The general offices of the company were closed and every employee who could be spared participated in the day's outing. The employees' band and orchestra provided music. Athletic contests filled the program for a greater part of the day.

**Injuries Caused from Short Circuit.**—A blowout at the switchboard in the power station of the Toledo Railways & Light Company, Toledo, Ohio, on the morning of Aug. 13, caused a suspension of service for one and one-half hours. A score of manufacturing plants, dependent for power, also were closed down. Two men who were cleaning the board were badly burned, and several others received minor injuries. The damage is placed at $3,000.

**New Company Publication in Wheeling.**—*Traction News* is the name of a little four-page leaflet being published weekly by the West Virginia Traction & Electric Company, Wheeling, W. Va. An article which appeared in the first issue states that "its purpose is to establish a closer relationship between the management, the employees and the traveling public" and invites patrons to make use of its columns by sending in suggestions freely.

**Car Posters Warn Against Pickpockets.**—Large posters printed in red ink have been placed in all the city cars of the International Railway, Buffalo, N. Y., urging passengers to "Beware of Pickpockets." Within the last month several hundred passengers have reported the loss of various sums of money, and the police have arrested a number of professional pickpockets but there have been no convictions. The thieves usually infest crowded cars in the downtown section during rush hours.

**Better Service Planned in Bellingham.**—At a recent meeting of the City Council of Bellingham, Wash., the Puget Sound Traction, Light & Power Company proposed service improvements to be made in that city. The company plans to inaugurate within thirty days a schedule which will give more frequent service between 6 a. m. and midnight. The new schedule will be delayed until the completion of six more light cars of the type now operating in the city, which will replace heavy cars in the regular service. The latter will be used only as trippers and on occasions when the traffic is unusually heavy.

**Fare Tariff Revised and Service Reduced.**—The Railroad Commission of California has authorized the Los Angeles & San Diego Beach Railway, San Diego, Cal., to revise its fare schedule so that monthly commutation tickets are increased in price, school tickets are put on a different basis, family commutation tickets are abolished and other changes are made. The company is also permitted to reduce its service to seven daily trains. The reason for these changes is the loss of traffic, due principally to the competition of privately owned automobiles. Jitneys have not been an important factor in the competition.

**Economics of Service Explained.**—In an editorial which appears in the August issue of the magazine published by the Southern Public Utilities Company, Charlotte, N. C., the reasons for the desire of a public service company to give continuity of service are set forth. It is pointed out that when a company fails to furnish service it not only loses revenue, due to the cessation of income from customers, but its interest charges, cost of labor, depreciation, etc., continue, together with the inconvenience and extra expense incurred in restoring service as quickly as possible. Obviously the annoyance to patrons is the smaller item.

**Seattle Opposes Elimination of Tickets.**—The city of Seattle has filed a protest with the Public Service Commission of Washington against the application of the Puget Sound Traction, Light & Power Company to discontinue selling 4-cent tickets. This application was to be effective on Aug. 12 and was noted in the ELECTRIC RAILWAY JOURNAL for July 28, page 164. The city's protest alleges that to discontinue the sale of twenty-five tickets for $1 would be a violation of the company's franchise obligations and that this is not authorized by the public service commission law. It requests that the action by the company be suspended until a hearing can be held in the case.

**Company Fined for Ignoring Schedule.**—The Virginia Railway & Power Company, Richmond, recently was fined $100 on each of two charges in police court for failing to maintain the proper schedule on two of its city lines. The penalty inflicted was the maximum allowed by law. Figures were submitted to show that the company had run too few cars during certain eight-hour periods. The company took appeal, contending that although it had violated the terms of its franchise it was meeting the public demand and, taken as a whole, was exceeding its schedule requirements. This was due to the fact that it operated more cars than required during rush hours and operated on some lines beyond the limits required.

**More Revenue Needed in Salt Lake City.**—The Utah Light & Traction Company, Salt Lake City, has filed a modified rate schedule with the Public Utilities Commission asking for permission to discontinue the sale of 4-cent tickets, to charge 1 cent for transfers and to raise the fare 5 cents on the Sandy-Midvale and Bountiful-Centerville lines. In a recent statement General Manager H. F. Dicke said that during the past three and one-half years only 4 per cent has been earned on the value of the property and that a fair return has been earned in only one year of the past eight and one-half. Competition from low-priced automobiles is given as one reason for the decline in revenue besides the general increase in operating expenses.

**Compromise Jitney Ordinance in Spokane.**—A compromise which, it is believed, will be satisfactory to pro-jitney and anti-jitney factions in Spokane, Wash., will be offered in a new city ordinance to be submitted by Commissioner Fassett. The commissioner's proposal is to allow the jitneys to operate over electric railway routes only for two-thirds of their complete trip. In other words, more than one-third of the trip must be made over streets having no railway service. Commissioner Fassett's scheme is considered by Spokane officials to be the first feasible plan for solving the present problem. Sentiment in the Council at present leans toward keeping the jitneys off the car lines, at least partially, and it is believed this proposal will be well received.

**Increase in L. I. R. R. Mileage Rates Held Up.**—The Public Service Commission for the First District of New York has refused permission to the Long Island Railroad to put into effect an increase in its mileage rates from $10 to $11.25 for a 500-mile book, pending the decision of the commission upon a number of increases proposed by the company and now under consideration. The mileage-book rates have been increased outside the city of New York, upon approval by the Second District Commission, and the company attempted to put into effect an increase in New York City, assuming that this commission had exclusive jurisdiction to fix a uniform rate for the whole system. It is to this course that the First District commission order applies. The company also does not think it practicable to apply the new rate only to lines in the Second District.

**Information Booth for Idle "Sammies."**—A free information booth which has been maintained by the San Diego (Cal.) Electric Railway has been proving a great convenience to the soldiers and sailors who have recently been stationed in the vicinity of San Diego as well as to visitors who are unfamiliar with points of interest about the city. To make it of more assistance to the men it has been requested that those in charge of special entertainments mail a card with full particulars to the company's publicity department. This information is then transmitted to the agent at the company's ticket office in the Union building and the agent in charge of the information booth.

**Commission Will Represent Public Before I. C. C.**—The Public Service Commission for the First District of New York announces that hereafter it will participate actively, through its counsel, in proceedings before the Interstate Commerce Commission which involve freight and passenger rates vitally affecting the public interest of the city of New York. Many cases greatly affecting freight rates, and thus the cost of commodities largely used in New York City, are heard each year by the Interstate commission at Washington, merely as an issue between shippers and railroads, without representation of the public point of view and the public interests. The New York commission, therefore, hereafter will undertake to fulfill the duty of expertly representing the public interests of the people and shippers of the city.

**Court Rules Against Jitney Bonding Company.**—Under a ruling of the Supreme Court on Aug. 7, jitney operators in the State of Washington cannot supply their own surety bonds through a mutual insurance organization, except on terms prescribed by the State Insurance Commission. This decision eliminates the Mutual Insurance Company of Seattle unless the company posts $250,000 in assets with the State insurance department, which was the amount fixed as security required for a mutual jitney bonding company in that State. The company petitioned the Supreme Court for a writ directing Commissioner Fishback to license it on the liability security requirements for general mutual insurance business. The Supreme Court, in denying the writ, held that it cannot control the insurance commissioner's statutory discretion in demanding what he considers security ample to insure protection.

**City Council Asks Inspection of Niagara Gorge Route.**—The City Council of Niagara Falls, Ont., has asked the Dominion Railway Board of the Province of Ontario to inspect the roadbed and tracks of the Park and River division of the International Railway, Buffalo, N. Y., operating between the Upper Bridge at Niagara Falls, Ont., and Queenston, Ont., along the lower gorge of the Niagara River. This division of the International Railway forms a part of the Great Gorge Route belt line trip, the other part being the line of the Niagara Gorge Railway on the American side between Lewiston and Niagara Falls, N. Y. The action of the Canadian City Council has been taken on account of the serious accident which recently occurred on the latter line on the American side, as noted in the ELECTRIC RAILWAY JOURNAL of July 7. In this accident, because of track undermining, a car dropped into the gorge near the Whirlpool Rapids.

**Ambitious Plan for Jitney Corporation.**—The General Motor Transportation Company of Oakland, Cal., has filed with the Railroad Commission of that State an application for authority to issue $250,000 capital stock, of which $500 has been subscribed, to engage in a general jitney business for passengers and freight. The intention of the company as stated to the commission is to operate a passenger stage line from Oakland, through San José, to Palo Alto on the east side of San Francisco Bay and from Oakland to San José, through Palo Alto, using the transbay ferry and runing down the west side of the bay. The company specifies its intention to haul fruits, vegetables and general merchandise and to do general cartage, the purpose being primarily to serve the farmers. No rates are stated, but the company expects these to vary, depending upon demand and the cost of operation. It wants to sell its stock at $90 a share, the par being $100. The company wishes to sell at the present time $50,000 of the total authorized stock issue of $250,000.

# Personal Mention

**C. D. Rogers** has been appointed president of the Bristol & Norfolk Street Railway, Randolph, Mass., to succeed H. F. French.

**H. K. Tennant** has been appointed comptroller of the Quebec Railway, Light, Heat & Power Company, Ltd., Quebec, P. Q.

**W. F. Bellinger** has been made chief load dispatcher of the system of the Georgia Railway & Power Company, Atlanta, Ga.

**Lyman K. Brown**, treasurer of the Fonda, Johnstown & Gloversville Railroad, Gloversville, N. Y., has resigned on account of ill health.

**Howard H. George**, formerly of the engineering staff of the Public Service Railway, Newark, N. J., has been promoted to the rank of major, engineers, Officers' Reserve Corps.

**Robert E. Jones**, claim adjuster for the Bay State Street Railway, Boston, Mass., has been promoted to fill the vacancy made by the resignation of John Kelley as chief district claim agent.

**Harry L. Bolinder** has been made claim adjuster for the Bay State Street Railway, Boston, Mass., to succeed Robert E. Jones. Mr. Bolinder was heretofore secretary to John T. Conway, general superintendent of the company.

**R. D. Long**, manager and purchasing agent for the Muskogee (Okla.) Electric Traction Company, has been appointed general manager of the Shawnee-Tecumseh Traction Company to succeed O. W. Weddle, resigned.

**George Drury**, district claim agent for the Bay State Street Railway at Lowell, Mass., has entered government service as first-class yeoman. Walter Hickey, starter at Lowell, has been transferred to the claim department.

**F. G. Grimshaw**, assistant engineer of electrical equipment for the Philadelphia terminal division of the Pennsylvania Railroad, has been promoted to the position of superintendent of motor power for the New Jersey division at New York.

**R. M. Boykin**, engineer for the North Coast Power Company of Portland, Ore., has been elected vice-president and appointed general manager of the company, following the resignation of H. L. Harries, who is at the military training camp at Presidio.

**Lionel S. Marks**, professor of mechanical engineering at Harvard and Massachusetts Institute of Technology, has been assigned by the national advisory committee on aeronautics to take charge of investigations relating to airplane engine design now being made by the Bureau of Standards.

**F. P. Will**, who resigned on June 1 as superintendent of the Burlingame (Cal.) Electric Railway to become general agent and warehouse manager for the Modesto & Empire Traction Company, Modesto, Cal., has been appointed city freight solicitor of the latter road to succeed W. T. Vary, resigned. The office of general agent has been abolished.

**F. P. Gutelius**, vice-president of the Schenectady (N. Y.) Railway and the Delaware & Hudson Company, with headquarters at Albany, N. Y., has taken over the duties of general manager of the latter road with the title of vice-president and general manager during the absence of General Manager James T. Loree, who entered military service on July 31.

**J. F. Usener**, formerly chief engineer of power stations of the Houston (Tex.) Electric Company, has been appointed chief engineer of the Galveston-Houston Electric Railway, to succeed Charles Learmouth, who has been transferred by the Stone & Webster Management Association to El Paso as chief engineer of the El Paso property. Mr. Usener has been connected with the Houston Electric Company ever since it was electrified. He will now have charge of the plants at League City, La Marque, South Houston and Sampson Street.

**William Siebert**, superintendent of surface transportation for the Brooklyn (N. Y.) Rapid Transit Company, was entertained recently at a dinner given by members of the transportation department, the occasion being his thirtieth anniversary in the service. Colonel T. S. Williams, president of the company, in behalf of Mr. Siebert's associates, presented him with a silver loving cup.

**Francis L. O'Bryan**, formerly electrical engineer of the Boston & Worcester Street Railway, Boston, Mass., has joined the staff of the Edison Electric Illuminating Company of that city. Mr. O'Bryan is well known in the electric railway field of New England for his original work in the development of the motor-driven semaphore-type signals in use on the Boston & Worcester. He will be engaged in the purchasing department of the Edison company.

**George A. Harris**, general auditor of the Fonda, Johnstown & Gloversville Railroad, Gloversville, N. Y., the Adirondack Light & Traction Company and the Edison Electric Light & Power Company of Amsterdam, N. Y., has been appointed auditor and treasurer of the three companies to succeed Lyman K. Brown, who has resigned as treasurer. This promotion is in recognition of his services with the above companies in the treasury and auditing departments for twenty-five years. Mr. Harris is also secretary and treasurer of the East Creek Electric Light & Power Company of St. Johnsville, N. Y., and four other companies allied with the Fonda, Johnstown & Gloversville Railroad.

**G. M. Cameron**, who has been master mechanic and engineer of buildings for the New York State Railways, Rochester Lines, during the last nine years, has located in Cleveland, Ohio, to become associated with David W. Morrow in general engineering work, with electric railway building design and construction as a specialty. While Mr. Cameron was connected with the New York State Railways he designed and constructed a number of railway buildings, power houses, substations, central station buildings, etc. He was graduated from Ohio State University in 1904 with the degrees of mechanical and electrical engineer. Soon afterward he entered the service of the Jeffrey Manufacturing Company of Columbus, in the mine locomotive department, and resigned one year later to accept a position with the Electric Controller & Supply Company in Cleveland. In 1906 he was appointed draftsman, as applied to power plant and equipment design, for the Cleveland Electric Railway and two years later became chief draftsman and engineer of buildings of the Rochester Railway. He was appointed master mechanic of that company in January, 1910.

F. I. HARDY

**Frank I. Hardy**, who, as reported last week, has been appointed general superintendent of the Northern Ohio Traction & Light Company at Akron, Ohio, has been general manager of the Chicago, South Bend & North Indiana Railway, South Bend, Ind., for the last year. Mr. Hardy has been actively engaged in steam and electric railway work for the last twenty years, serving successively in different capacities the Southern Pacific Railroad, the New York Central & Hudson River Railroad, the Union Traction Company of Indiana and the Fort Wayne & Northern Indiana Traction Company. He was employed by the last-named company in 1905 as division superintendent and later became superintendent of transportation. In July, 1911, Mr. Hardy was appointed superintendent of transportation for the Chicago, South Bend & Northern Indiana Railway, with entire charge of operation and traffic matters. Five years later he was promoted to the position of general manager of the company, the position he has just relinquished, to succeed C. D. Emmons, who became vice-president and general manager of the Boston & Worcester Street Railway, Boston, Mass.

**C. A. Goodnow**, assistant to the president of the Chicago, Milwaukee & St. Paul Railway, has been elected vice-president of the company. Mr. Goodnow is widely known for his work while in charge of the St. Paul electrification, the Seattle division of which is now under way. He was born at Baldwinsville, Mass., in 1853 and entered railway service at the age of fifteen as a telegraph operator for the Vermont & Massachusetts Railroad. He became superintendent of construction of the Chicago, Milwaukee & St. Paul in 1886 and later became general superintendent of the road. From 1902 till 1913 he held executive positions with several other steam roads and since that time has been assistant to the president of the Chicago, Milwaukee & St. Paul.

R. B. STEARNS

**R. B. Stearns**, vice-president of the Milwaukee Electric Railway & Light Company, has been elected senior vice-president in charge of operation of the Bay State Street Railway, Boston, Mass. In commenting upon this appointment President P. F. Sullivan made the following statement: "New conditions have placed such a heavy burden upon the officials of our company that it has been necessary to divide some of the work. Mr. Stearns has been asked to come with us because of the conspicuously successful work he has done in the West. In Milwaukee he had charge of a property with 450 miles of track, doing a business in excess of $6,000,000 a year. During his six years with that company he won not only the loyalty of his employees but the friendship of the public. Under his management practically all the cars were rebuilt and standardized maintenance was adopted, two new car stations were designed and finished, many miles of new track were laid, and other improvements of service made. His dealings with the employees were particularly successful. He inaugurated the Employees' Mutual Benefit Association and the Employees' Mutual Building, Savings & Loan Association, and carried through other plans which developed the co-operative spirit and produced desirable results for both employees and company." President Mortimer of the Milwaukee company, in announcing Mr. Stearn's resignation, said: "When Mr. Stearns made known to me the nature of the position with the Bay State Street Railway I could only advise him to accept it as an act of simple justice to himself. He will be in direct charge of the operation of all the departments of the company, and while his work in Massachusetts will probably be no more difficult than his work here, his responsibilities will certainly be greater. No man having direct charge of any street railway can ever be a hero in the eyes of the public; the only hero is one who attacks. Mr. Stearns here has had the most difficult of tasks and despite it all he was never known to lose his temper or answer attacks in kind." After graduation from Purdue University in 1889, Mr. Stearns' first activities were in Chicago in connection with the Columbian Exposition, the Drainage and Hennepin Canals and the elevated railroads. At one time he was chief engineer of the Northwestern Elevated Railroad and later general manager of the Chicago & Milwaukee Electric Railroad. He became assistant general manager of the Milwaukee company in 1911 and vice-president a few months later.

## Obituary

**Dr. Levi T. Durbin**, company physician for the Denver (Co.) Tramway, recently died suddenly at the age of fifty-nine. He was one of the veterans in the Tramway service, having been in its employ for twenty-six years. Mr. Durbin was born in Wooster, Ohio. He was graduated from the University of Denver School of Medicine in 1884. Later he became an instructor at that institution and had been connected with the Denver Tramway since 1891.

# Construction News

Construction News Notes are classified under each heading alphabetically by States.

An asterisk (*) indicates a project not previously reported.

## FRANCHISES

**Phoenix, Ariz.**—The Phoenix Street Railway has received from the City Commission a three-year extension of time on its franchise to double track West Washington Street to the capitol and to pave a portion of that street and other streets of the city.

**Long Beach, Cal.**—The Pacific Electric Railway has asked the Railroad Commission of California for permission to remove its tracks from East Ocean Avenue from First Place eastward. A hearing on this question will be conducted by the commission on Sept. 17.

**Atlanta, Ga.**—The Georgia Railway & Power Company has asked the Board of County Commissioners for a franchise to double-track its line on Peachtree Road from "Dead Man's Curve" to Buckhead.

**Alton, Ill.**—Franchises have been drawn up and presented to the Councils of the various towns along the proposed right-of-way of the new interurban line of the Alton & Edwardsville Railroad between Alton and Edwardsville. The right-of-way has practically all been secured. H. H. Ferguson, Alton, is interested. [Aug. 11, '17.]

***Galesburg, Ill.**—The Public Utilities Commission of Illinois has issued an order granting a certificate of convenience and necessity to the Galesburg, Rockford & Northern Railroad to construct a line from Galesburg to Rockford, via Kewanee, Dixon and Oregon. The commission also authorized the company to issue $26,700 in capital stock and bonds in the sum of $50,000, and also to purchase the Dixon, Rock Falls & Southwestern Railway, operating between Hooppole, Yorktown and Tampico.

**Oak Park, Ill.**—The Chicago & West Towns Railroad has received a twenty-five-year franchise from the Oak Park village board. New lines in Division Street and in Harlem Avenue from Division to Twelfth Street are provided for.

**Cheektowaga, N. Y.**—The International Railway has asked the City Council for a franchise to construct a double-track extension in Cheektowaga.

**Easton, Pa.**—The Northampton Traction Company has received permission from the Public Service Commission of Pennsylvania to construct an extension to College Hill. Eventually the company expects to construct an extension from College Hill to the western section of the city.

## TRACK AND ROADWAY

**Montgomery Light & Traction Company, Montgomery, Ala.**—This company plans to double-track its line from Montgomery to Pickett Springs, a distance of 6 miles.

**Pacific Electric Railway, Los Angeles, Cal.**—Extensive trackage improvements have been begun by the Pacific Electric Railway in Long Beach, which will amount to about $25,000.

**Oakland, Antioch & Eastern Railway, Oakland, Cal.**—It is reported that the Western Pacific Railroad and the Oakland, Antioch & Eastern Railway have entered into an agreement whereby the former road will finance the latter in the construction of a branch line to tap Suisun and the Vaca Valley. It is understood that the branch will extend from a point on the Oakland, Antioch & Eastern main line near Montezuma to Suisun, where connections will be made with the Vaca Valley and Suisun branch of the Northern Electric Railway. The project, it is said, will involve an expenditure of about $500,000.

**Cienfuegos, Palmira & Cruces Electric Railway & Power Company, Cienfuegos, S. C., Cuba.**—A report from this company states that it will construct an extension from Palmira to Cruces, about 10 miles.

**Miami (Fla.) Traction Company.**—An extension will be built by the Miami Traction Company to Buena Vista.

***Pocatello, Idaho.**—An attempt is being made to finance an electric railway in Pocatello. Richard Douglass, Gate City Motor Company, is reported interested.

**Chicago, North Shore & Milwaukee Railroad Company, Highwood, Ill.**—This company is placing temporary tracks on County Street, Waukegan, between Clayton and Madison Streets, which is said to be preparatory to the building of a new loop for cars passing up Genesee Street to Clayton Street, west on Clayton to County Street, south on County to Washington and thence east to Genesee Street.

**Indianapolis Traction & Terminal Company, Indianapolis, Ind.**—The Board of Public Works of Indianapolis has confirmed five resolutions providing for the vacating and widening of parts of Brookside Avenue to make possible the construction of a double-track line to the plant of the Premier Motor Corporation. The proposed line will extend from Brookside Avenue and Eighteenth Street to Twentieth Street and in Twentieth Street from Brookside Avenue to Olney Street.

**Wichita Railroad & Light Company, Wichita, Kan.**—This company will construct new track in Wichita where paving is to be done.

**United Railways & Electric Company, Baltimore, Md.**—Automatic signals of the Nachod type have been installed by the United Railways & Electric Company on its Halethorpe line, about 2¾ miles.

**Springfield (Mass.) Street Railway.**—It is understood that plans are under way for a through passenger trolley route from Springfield to Worcester via Palmer, Ware and West Brookfield. This is to be brought about by the taking over of the Ware & Brookfield Company's branch between Ware and Gilbertville by the Springfield Street Railway and the operation over it of the cars of this company, which now operate only between Palmer and Ware. A connection is being built at West Brookfield between the track of the Worcester & Warren line and that of the Ware & Brookfield line. When this is completed cars can run between Spencer and Ware without change. At Ware a connection is to be made between the tracks of the Ware & Brookfield line and the Springfield line. The new arrangement also contemplates a trolley freight service to Gilbertville.

**Worcester (Mass.) Consolidated Street Railway.**—Plans have been filed by the Worcester Consolidated Street Railway with the Public Service Commission of Massachusetts for the proposed extension of its tracks in East Worcester and Albany Streets, as approved by the Board of Aldermen, to be used in connection with its freight business entering and leaving the proposed trolley freight stations to be erected between Albany and Shrewsbury Streets.

**Grand Rapids (Mich.) Railway.**—Work has been begun by this company reconstructing its Grandville Avenue line on Ellsworth Avenue from Fulton Street to King Street.

***Las Cruces, N. M.**—H. M. Gray of Las Cruces and associates are promoting the construction of an interurban electric railway from Las Cruces to El Paso, 44 miles. The proposed line will extend through the irrigated portion of the Rio Grande valley, which is thickly populated. It is said that financial arrangements for the construction of the line have been made and that the work will be begun as soon as the survey is finished and the right-of-way obtained.

**Piedmont & Northern Railway, Charlotte, N. C.**—This company is building an extension to Camp Wadsworth.

**Southern Public Utilities Company, Charlotte, N. C.**—Bids have been asked by the Southern Public Utilities Company for the construction of two extensions, each 1 mile long, into Camp Greene, near Charlotte.

**Oklahoma (Okla.) Railway.**—Right-of-way has been secured by the Oklahoma Railway within the city limits of Guthrie. The ground acquired by the company will be used for trackage and a direct line in and out of the city and for terminal building purposes. The line now running to the park will be abandoned by the interurban line, but city street car service will be inaugurated in its place. Work will be begun immediately on the building of track over the acquired land to a juncture with the interurban south of the city. The new line will shorten the time between Guthrie and south stations.

**Port Arthur (Ont.) Civic Railway.**—Plans are being prepared by the city engineer for the erection of two new bridges over the McIntyre River, one for each track.

**Johnstown (Pa.) Traction Company.**—Plans are being contemplated by the Johnstown Traction Company for the construction of extensions in the Seventh and Seventeenth Wards and in Woodvale.

**Philadelphia, Pa.**—Sealed proposals will be received by the Department of City Transit, Philadelphia, William S. Twining, director, for the following work appurtenant to the Frankford Elevated Railway: Contract No. 524—Steel frame work and railings, concrete floors and parapets, side inclosures, roofs, drain gutters and spouts for ten station platforms and connecting passages or foot bridges between station platforms and station buildings at Allegheny Avenue, Tioga Street, Torresdale Avenue, Ruan-Church Streets and Orthodox-Margaret Streets.

**Philadelphia & West Chester Traction Company, Upper Darby, Pa.**—This company will construct an extension of its Collingdale line to the Sharon Hill section.

**Columbia Railway, Gas & Electric Company, Columbia, S. C.**—A double-track line from the limits of Columbia to Camp Jackson has been completed by the Columbia Railway, Gas & Electric Company and operation will be begun at once.

**Northern Texas Traction Company, Fort Worth, Tex.**—A double-track extension of the Arlington Heights line will be built by the Northern Texas Traction Company to Camp Bowie. the United States army training camp established near Fort Worth.

**Port Arthur (Tex.) Traction Company.**—It is reported that the Port Arthur Traction Company will construct an additional line in Port Arthur, paralleling its present main line through the city at a distance of 6 blocks.

**Salt Lake, Garfield & Western Railway, Salt Lake City, Utah.**—Work on the elctrification of the Salt Lake, Garfield & Western Railway and the extension of its lines to Garfield is now under way. It is stated that a contract has been entered into between the company and the Utah Light & Traction Company providing for the use of the street car tracks by Saltair trains. The road is being engineered and equipment designed by H. A. Strauss of Chicago.

**Monongahela Valley Traction Company, Fairmont, W. Va.**—Plans are being made by this company for the construction of an extension from Bridgeport to Rosemont, Flemington, Galloway, Wendell and Simpson to reach the coal mining towns.

### SHOPS AND BUILDINGS

**Southern Pacific Company, San Francisco, Cal.**—This company contemplates the construction of a one-story brick passenger station at Victoria, at a cost of about $25,000.

**Sioux City (Iowa) Service Company.**—This company will construct an 80-ft. x 244-ft. addition to its carhouse at Greenville at a cost of about $12,000.

**United Railways & Electric Company, Baltimore, Md.**—This company plans the construction of a new waiting station at Overlea.

**Youngstown & Suburban Electric Railway, Youngstown, Ohio.**—It is reported that this company contemplates the construction of a new station and power station at Columbiana.

**Tulsa (Okla.) Street Railway.**—This company plans to construct an addition to its carhouse in Tulsa to take care of new equipment expected this fall.

**Tacoma (Wash.) Municipal Railway.**—L. A. Nicholson, city engineer, has been instructed by the City Council to prepare plans and specifications for the construction of a new carhouse for the Tacoma Municipal Railway on the tideflats.

### POWER HOUSES AND SUBSTATIONS

**Fort Smith Light & Traction Company, Fort Smith, Ark.**—The erection of a new power house to cost about $250,000, either on the site of the present power house on the Arkansas River or on Poteau River in Le Flore County, is under consideration by the Fort Smith Light & Traction Company. The present plans provide for a plant of 5000 hp. capacity. The present plant has an output of 4200 hp., which it is proposed to enlarge and improve so that the two plants will have a generating capacity of 10,000 hp.

**Georgia Railway & Power Company, Atlanta, Ga.**—A petition has been presented to the Railroad Commission of Georgia by the Georgia Railway & Power Company for permission to issue $2,500,000 in bonds, the proceeds to be used for the installation of the sixth unit in the Tallulah Falls power station, the construction of a new reservoir on the Tallulah River, above Rabun Lake, to be known as the Burton reservoir, and the construction of a new power station, 2 miles below the Tallulah Falls plant, near the junction of the Tallulah and Chattooga Rivers, at the point where they form the Tuglo River.

**Chicago, Milwaukee & St. Paul Railway, Chicago, Ill.**—According to recent reports the Chicago, Milwaukee & St. Paul Railway Company will begin work the latter part of August on the construction of a $25,000 substation on the tideflats, in connection with the electrification of its lines in Tacoma and in the State of Washington.

**Chicago & Joliet Electric Railway, Joliet, Ill.**—On account of the necessity to take current from the Public Service Company's new steam plant at Joliet, at the generating pressure of 12,000 volts instead of at 2300 volts as at present, this company is installing transformers and lightning protection for this service at Joliet. An underground cable connection between the railway substation and the Public Service Company's new substation under construction at the corner of Jackson and Ottawa Streets will also be provided. In planning for the changes necessary, it was decided to construct and equip an entirely new railway substation at Joliet and to install an automatic substation at Dellwood Park between Joliet and Lockport. The latter station will enable the company to release 5000 lb. of aluminum cable, and the sale of this and the equipment in the present Joliet substation, at the prevailing prices, will pay a large part of the cost of the new equipment. The new Joliet substation will be located at the northwest corner of St. Louis and Osgood Streets, adjoining the carhouse and shops of the company. Two General Electric Company 750-kw. synchronous converters and six 260-kva., 13,200/445-volt transformers with the necessary switchboard equipment for the Joliet station, and one 300-kw. converter together with three 100-kva. transformers and automatic control equipment for the Dellwood station have been purchased. It is expected to have these stations in operation by Jan. 1, 1918. In order to release the aluminum cable at once, a 250-kw. motor-generator set for temporary use has been installed at Dellwood Park.

**St. Joseph Railway, Light, Heat & Power Company, St. Joseph, Mo.**—One of the provisions which are being made by the St. Joseph Railway, Light, Heat & Power Company to increase the steaming capacity of the boilers for the coming winter, is to install larger stokers. Two of the 440-hp., 21 x 10 tube, B. & W. boilers are equipped with five-retort Tayler stokers. An extra retort is being added to each of these stokers, which will increase the steaming capacity approximately 20 per cent. The Tayler "power dump" feature is being provided as well as additional draft capacity. Two of the 440-hp. boilers are equipped with Green chain stokers, containing approximately 90 sq. ft. of grate area each. These stokers are to be replaced by wider and longer ones of the same make, containing 136 sq. ft. of grate area. This change will add approximately 50 per cent to the steaming capacity of the two boilers.

**International Railway, Buffalo, N. Y.**—A new substation about 75 ft. x 90 ft. will be built by the International Railway on North Division Street.

**Toledo Railways & Light Company, Toledo, Ohio.**—Henry L. Doherty & Company report that about 500 men are at work on the construction of the great power plant of the Toledo Railways & Light Company on the Maumee River, near the center of the city. It is expected that the first unit will be in operation by Dec. 1.

**Tacoma (Wash.) Municipal Railway.**—L. A. Nicholson, city engineer, has been instructed by the City Council to prepare plans and specifications immediately for the construction of a concrete substation for the Tacoma Municipal Railway on the tideflats.

# Manufactures and Markets

**Discussions of Market and Trade Conditions for the Manufacturer, Salesman and Purchasing Agent**

**Rolling Stock Purchases Market Quotations Business Announcements**

## Manufacturers and Purchasers Should Be Honest with Each Other

### "Wolf" Cry of Purchasers as Trying to Manufacturers as Inconsistent Alibis of Latter Are to Railway Men

In the condition of disregard for each others' interests existing between some manufacturers and some railways, it seems quite evident to the outside interested observer that both parties are at fault. In trying to overcome the long-delivery condition of the market, the railway men have formed a habit of telegraphing their orders for materials, sending them by special delivery, marking them rush, and in other ways conveying the impression of very urgent need. This has become such common practice that the manufacturers are treating such markings as matter of fact, with the result that the railway company really in trouble is much in the same predicament as the man who cried "wolf" —it may get no special attention on a wired order. The purchasers should realize, knowing as they now do the general condition of the market and the difficulty the manufacturers face in getting materials, that not every order can be treated as truly a rush order, and that the surest way of guarding against shortage of material is to anticipate their needs and place the order far enough in advance to assure delivery before their supply is exhausted. In other words, the manufacturer should not be expected to continually disrupt the routine through his plant in order to cover someone's neglect to order material until he was out of it or nearly so. Some purchasing agents are helping in this situation because of their knowledge of the market, by disregarding requests of various department heads to wire in an order for such and such material, and then sending the order by mail in the usual way.

#### IRREGULARITIES IN DELIVERIES SHOULD BE AVOIDED

On the other hand, the manufacturers should be consistent when offering explanation of failure to make delivery as promised. Incidents are related by the purchasing agents which strike them as either disgusting or humorous, depending on the circumstances and their frame of mind. In one instance, when the purchasing agent was trying to find out the reason for non-receipt of material as promised, the manufacturer replied that it was absolutely impossible to get cars. However, the fact that this same manufacturer had shipped twelve carloads of the same material to the same purchaser on an order placed later at a much higher price, naturally caused the purchasing agent to think that there were considerations other than the car shortage question entering into the alibi.

Another purchasing agent on several different occasions has experienced the embarrassment, upon cancellation of orders, of receiving a reply from the manufacturer that the material had been shipped a few days previously. This occurred after previous report had been made shortly before cancellation that it would be impossible to ship for thirty or sixty days, and the purchasing agent had accordingly scoured the country to supply his needs from another source. This, he said, had occurred too frequently to warrant belief that there was no juggling of the order of shipments. Another interesting case was one in which the purchasing agent had received a letter dated July 31, saying that the manufacturer would be unable to ship the order promised for delivery July 1 until the middle of August, and then only part of it with the remainder to be shipped the last of August. A few days after this the railway company took on a government contract which required the use of this material. The purchasing agent accordingly wired the manufacturer to this effect, and the latter replied that the order had been shipped complete early in July.

The manufacturers are endeavoring certainly to avoid such errors as these, but perhaps calling attention to them in these columns will serve as a reminder to tighten up on these details of the customary follow-up.

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## War Conditions Help Standardization

### Many Railways Forced to Use Standardized Products, No Other Being Obtainable—Cost of Special Apparatus Prohibitive

Many railways that have found it imperative to build additional mileage on account of cantonments or extensions required by franchises have applied to the steel mills to be included on future rollings of standard rail sections such as are used by the steam railroads. The railways have been forced to follow this procedure, as deliveries on special sections are quoted from twelve to fifteen months, with no guarantee that the amount desired will be forthcoming at the end of that time. A good many railways, of course, cannot avail themselves of this opportunity because the most of their mileage is laid on paved streets in the cities where girder rail is required. Interurban railways find that it is much cheaper to purchase 100-lb. standard section as used on steam roads than lighter sections which are practically impossible to obtain except in second-hand markets.

#### GOOD DELIVERIES ONLY ON STANDARDIZED PRODUCTS

In many cases standardized products are the only ones obtainable at present, and those few engineers who formerly have insisted upon special products are accepting the inevitable as the only possible means to an end. In speaking of standardization a well-known engineer in the railway and central station industry recently said: "Our industry, like others, is burdened with a few 'over-educated' engineers who cannot see any good in standardization. They must design their own turbines, boilers, condensers and meters, and even the push buttons for the wardrobe closets do not escape. These 'brainstormers' of engineering bless the manufacturer with contracts filled with conditions and changes in specifications that take at least 50 per cent more time to fulfill and obtain a product that is as a rule inferior to the standard. It is pretty safe to assume that the builders know more about their own business than the average outsider."

While visiting a plant in New England which makes a considerable amount of railway castings, forgings, etc., the writer arrived at the plant while the manager was discussing with one of the salesmen an order which had just been received. The order was for a very small number of special castings which this company had been able to make for a large customer, but on which there was no profit. Although the order was a small one, the company hated to disappoint the large customer and the order was accepted. In speaking of this order the manager said: "If we should return such orders to the companies from which they were received with a check for $50 we would still be money ahead."

Heroic efforts are being made by the United States government to speed up production, and without standardization this would be an impossibility. The prosperity of many industries is due directly to standardization. Manufacturers have not only been able to produce apparatus and accessories in large quantities and at greatly reduced prices compared with those prevalent before standardization was introduced, but are also in a position to make fairly good deliveries on those products.

## Forced Reconstruction Work Helps Steel Tie Sales

### Pavement Improvements or Extensions Responsible for Much Work—Inquiries Good, but Most Sales for Forced Work

The number of miles of reconstructed and extended track is less this year than ever before, according to a well-known sales manager of rail products. Ninety per cent of the business is forced reconstruction on pavement improvements or extensions on account of franchises. Practically no work has been voluntarily done in paved street work. Although sales in 1916 showed a 100 per cent increase over the previous year, this year's sales for six months have amounted to more than that secured during all of the year 1916. Most of this business was secured in the Central West.

The demand for steel ties and crossing foundations has been greatly increased by companies that are putting in concrete construction for the first time. The use of steel ties has so reduced the depth and width of the foundation slab that the cost of the excavation and of the concrete is cut in half. This has virtually made the steel tie a wartime tie. Labor is not only conserved but materials as well, and the effect of saving space in shipments has its effect on conserving cars in shipping. To build 1 mile of track requires 880 steel ties, and 1000 of these ties can easily be loaded on two standard steam freight cars. On the other hand, 2640 wooden ties are required for a mile of track, for which six to eight cars must be provided.

### RAILWAYS USING STANDARD RAIL SECTIONS

The company in question has had more business pending than was obtained altogether. If conditions were normal the business transacted would be more than double what it is at present. High prices and inability to obtain labor has caused the postponement of work in many cities. Those in which war industries are being carried on have had the greatest labor shortage. At one city on the Great Lakes the engineer in charge of the track work was an old experienced man and had purchased his material months in advance so that the work would not be delayed by the high prices and poor delivery situation. The work which he had planned, however, cannot be completed because labor is so scarce and can be obtained only at a prohibitive figure. Many companies find that they are unable to get rails for new work and have been forced to substitute standard section rail used by the steam railroads. Of the latter many railways are laying the 100-lb. Dudley, as used on the New York Central, and the 100-lb. A. R. A., or any other sections that can be obtained. Many roads which use a special section will now find that they are at a very great disadvantage because the standard sections that are now available cannot be used on their property. As much of the business has been transacted in the Middle West little trouble has been occasioned on account of car shortage. Embargoes, however, have held up shipments to the East very badly. On one shipment to the State of Connecticut made early in December the company reported late in January that the shipment had not been received, and on being traced it was found just outside of the shipper's yard.

### RAW MATERIAL, PRICES AND DELIVERIES

Contracts covering raw material are in effect and, with the exception of one or two small items used in steel tie and crossing foundation work, practically no trouble has been encountered in obtaining them. The prices of steel ties and crossing foundations have increased 20 per cent, and the only reason the increases have not been considerably greater is that the company was fully protected by long-time contracts. No difficulty is being experienced in making prompt deliveries at the present time. As a rule frog and switch manufacturers require six months for delivery of crossing foundations. The only product on which this company has been unable to get prompt deliveries is malleable-iron clips. Deliveries on the dates promised have been made but the stock on hand has gradually been reduced. The high prices of special track work, manganese, steel crossings, etc., has greatly increased sales of steel ties and crossing structures.

## Steel Shortage May Influence Wooden Car Purchases

Considerable difficulty is being experienced by some of the car manufacturers in obtaining steel plates for use in building electric railway steel cars. One manufacturer has actually had to go back to several of its customers and tell them that if they could by any means or influence get the steel, that the cars would be promptly built. In at least one case the customer made a very determined effort to get the necessary material from some source, but, at latest reports, had been unsuccessful in obtaining a promise of anywhere near satisfactory delivery.

While this condition prevails in the steel market, the manufacturer referred to had plenty of lumber in its own stock, with which first-class wooden cars could be built. This condition brings up the consideration that it may be necessary for those companies which require additional equipment promptly to forego some of the operating economies possible with the lighter weight steel car, for the sake of getting delivery on a slightly heavier wooden car which may be earning considerable revenue during the many months that it will be necessary to wait for a steel car.

## Report on the Coal Situation

In its report for Aug. 11 the United States Geological Survey states that during the three weeks ended July 28, the "lost time" reported by the bituminous coal mines represented between one-fourth and one-fifth of the production of the country. The causes were approximately as follows: Car shortage, 16 per cent; labor trouble or shortage, 4½ per cent; mine disability, 4 per cent. More than 800 mines in twelve States are now furnishing weekly statements.

The chief topic of interest in oil, paint and varnish circles is the recent increase in raw and boiled linseed oils which have advanced 10 to 12 cents a gallon in the last two weeks. Poor progress of the growing seed crop as shown by reports from the Department of Agriculture and a sharp advance in oils of all kinds are said to be responsible for the increase.

## NEW YORK METAL MARKET PRICES

| | Aug. 3 | Aug. 17 |
|---|---|---|
| Prime Lake, cents per lb. | 29 | 28 |
| Electrolytic, cents per lb. | 29 | 28 |
| Copper wire base, cents per lb. | 36 | 36 |
| Lead, cents per lb. | 10⅞ | 10⅞ |
| Nickel, cents per lb. | 50 | 50 |
| Spelter, cents per lb. | 8¾ | 8¾ |
| Tin, Straits, cents per lb. | 63¾ | 62¼ |
| Aluminum, 98 to 99 per cent, cents per lb. | 56 | 56 |

## OLD METAL PRICES

| | Aug. 3 | Aug. 17 |
|---|---|---|
| Heavy copper, cents per lb. | 23½ | 24½ |
| Light copper, cents per lb. | 20½ | 21½ |
| Red brass, cents per lb. | 19 | 19½ |
| Yellow brass, cents per lb. | 15½ | 16 |
| Lead, heavy, cents per lb. | 8½ | 8½ |
| Zinc, cents per lb. | 6 | 6 |
| Steel car axles, Chicago, per net ton | $45.00 | $41.00 |
| Old car wheels, Chicago, per gross ton | $31.50 | $31.50 |
| Steel rails (scrap), Chicago, per gross ton | $43.00 | $39.00 |
| Steel rails (relaying), Chicago, per gross ton | $60.00 | $55.00 |
| Machine shop turnings, Chicago, per net ton | $16.50 | $17.00 |

## CURRENT PRICES FOR MATERIALS

| | Aug. 3 | Aug. 17 |
|---|---|---|
| Rubber-covered wire base, New York, cents per lb. | 36½ | 34½ |
| No. 0000 feeder cable (bare), New York, cents per lb. | 36½ | 36½ |
| No. 0000 feeder cable (stranded), New York, cents per lb. | 33¾ | 33¾ |
| No. 6 copper wire (insulated), New York, cents per lb. | 33 | 33 |
| No. 6 copper wire (bare), New York, cents per lb. | 36 | 36 |
| Rails, heavy, Bessemer, Pittsburgh | $38.00 | $38.00 |
| Rails, heavy, O. H. Pittsburgh, per gross ton | $40.00 | $40.00 |
| Wire nails, Pittsburgh, per 100 lb. | $4.00 | $4.00 |
| Railroad spikes, 9/16 in., Pittsburgh, per 100 lb. | $7.00 | $7.00 |
| Steel bars, Pittsburgh, per 100 lb. | $4.50 | $4.50 |
| Sheet iron, black (24 gage), Pittsburgh, per 100 lb. | $8.35 | $8.35 |
| Sheet iron, galvanized (24 gage), Pittsburgh, per 100 lb. | $9.55 | $9.55 |
| Galvanized barbed wire, Pittsburgh, cents per lb. | $4.85 | $4.85 |
| Galvanized wire, ordinary, Pittsburgh, cents per lb. | $4.65 | $4.65 |
| Cement (carload lots), New York, per bbl. | $2.22 | $2.22 |
| Cement (carload lots), Chicago, per bbl. | $2.31 | $2.31 |
| Cement (carload lots), Seatle, per bbl. | $2.60 | $2.65 |
| Linseed oil (raw, 5 bbl. lots), New York, per gal. | $1.13 | $1.24 |
| Linseed oil (boiled, 5 bbl. lots), New York, per gal. | $1.14 | $1.25 |
| White lead (110 lb. keg), New York, cents per lb. | 12¾ | 12¾ |
| Turpentine (bbl. lots), New York, cents per gal. | 42½ | 42½ |

## ROLLING STOCK

**Cataluna Railways, Barcelona, Spain,** are in the market for forty cars.

**Pensacola (Fla.) Electric Company** is reported to have purchased four large interurban cars for its Bay Shore line.

**Sand Springs (Okla.) Interurban Railway** lost one motor car and six trailers in a fire which partially destroyed the company's carhouse. The loss is estimated at $25,000.

**Henry L. Doherty Company, New York, N. Y.,** is reported to be considering the purchase of a large number of cars for its St. Joseph, Mo., Toledo, Ohio, and other properties.

**Clinton, Davenport & Muscatine Railway, Davenport, Iowa,** has been considering the use of one-man cars for some time and expects to be in the market for some equipment of this type in the near future.

**Northwestern Pennsylvania Railway, Meadville, Pa.,** has specified the following details for two trailer box freight and for two double-end package freight cars being constructed by the Wason Manufacturing Company.

| | Double-End Package Freight | Trailer Box Freight |
|---|---|---|
| Number of cars ordered | 2 | 2 |
| Date of order | June | June |
| Date of delivery | September | September |
| Builder | Wason Mfg. Co. | Wason Mfg. Co. |
| Type | Double-end, package freight | Trailer box freight |
| Carrying capacity | 30 tons | 30 tons |
| Weight (total) | 50,000 lb. | 40,000 lb. |
| Bolster centers, length | 29 ft. | |
| Over bumpers | 45 ft. 11⅝ in. | 36 ft. |
| Over vestibule | 44 ft. 11⅝ in. | 34 ft. 4 in. |
| Width over all | 8 ft. 8⅛ in. | 8 ft. 6 in |
| Rail to trolley base | 12 ft. 10 in. | |
| Body | Steel underframe—wood body | Steel underframe—wood body |
| Interior trim | Sheathed with spruce | None |
| Headlining | None | None |
| Roof | Arch | Arch |
| Trucks | Peckham | Wason diamond frame with used GE-57 motors |

## TRADE NOTES

**Shepard Electric Crane & Hoist Company, Chicago, Ill.,** has opened an export department at 30 Church Street, New York City.

**Davis-Bournonville Company, New York, N. Y.,** has moved its Detroit office from 88 Adams Avenue W. to 427 Grand River Avenue.

**Edward H. Hill,** secretary and treasurer of the McQuay-Norris Manufacturing Company, St. Louis, Mo., died Aug. 11 after an illness of several weeks.

**George B. North** has been appointed general sales manager of the Hazard Manufacturing Company, Wilkes-Barre, Pa., and will be located at 533 Canal Street, New York City.

**L. S. Henley,** formerly electrical engineer for the Cornwall Ore Banks Company, has accepted a position with the Westinghouse Electric & Manufacturing Company, Philadelphia, Pa.

**Henry D. Lindsley** and **Thomas T. Desmond** announce the organization of their business as investment bankers and engineers under the name of Lindsley, Desmond & Company, with offices at 31 Nassau Street, New York City.

**Theodore Swann,** who has been sales manager of the Alabama Power Company for the last three years, has resigned to become president and general manager of the Southern Manganese Corporation.

**George Cutter Company, South Bend, Ind.,** announces the appointment of R. W. Ten Broeck and A. B. Sonneborn as sales representatives for the state of Michigan, with offices at 426 Ford Building, Detroit.

**Safety Car Devices Company, St. Louis, Mo.,** advises that the Monroe, La., safety car described in the Aug. 11 issue of the ELECTRIC RAILWAY JOURNAL is equipped with its well-known air-operated Safety combination instead of manually-operated doors and steps, as mentioned in the article.

**Roy L. Baker** has resigned as power sales engineer of the Commonwealth Edison Company, Chicago, Ill., to become manager of the steam and electrical department of the Railway & Mine Supply Company, 332 South Michigan Avenue, Chicago, Ill.

**Adrian D. Joyce,** general manager of sales and distribution of the Sherwin-Williams Company, has been appointed by the Federal War Industries Board to membership on a special committee for the standardization of paints and varnishes in connection with war purchases. On the committee with Mr. Joyce are six other prominent paint manufacturers of the country.

**Ohio Brass Company, Mansfield, Ohio,** reports the following changes in its organization: J. E. Slimp, who has represented the company for a number of years, first in the South with headquarters in Atlanta and later in New England with headquarters in Boston, has been transferred to an important position in the home office at Mansfield, Ohio. L. A. Wilson has been appointed to represent the company in New England. He will make Boston his headquarters. Mr. Wilson has a wide acquaintance in the New England territory where he has traveled for a number of years in the interests of the lamp department of the General Electric Company.

**National Board of Fire Underwriters, New Yok, N. Y.,** headquarters at 76 William Street, has issued a poster about 11 in. x 14½ in., containing seven suggestions on how to prevent fires. The card is illustrated with border sketches and is issued with the indorsement of the Council of National Defense. It is headed "A Patriotic Duty of Every American Is to Prevent Fire." Some 60,000 of these cards are being mailed to the leading manufacturers throughout the country with a booklet of directions for the prevention of fire, under the title of "Safeguarding Industry." Copies will be sent to any manufacturer on request, without expense to him.

**Peter M. Kling,** consulting engineer Laconia Car Company, has severed his active connection with that organization. He says in his letter of resignation that having devoted thirty-four years of the best part of his life to the car industry, he felt that he was now entitled to enjoy a much-needed rest. Mr. Kling has long been prominent in the car building industry, and his experience dates back to the days of animal traction. When superintendent of the Brownell Car Company, he was largely responsible for the Brownell "accelerator," easy-access car. Later he was successively vice-president and general manager of the St. Louis Car Company, general manager of the John Stephenson Company, and manager of the passenger car department of the Pressed Steel Car Company. In 1912 he assisted the mechanical department of the Brooklyn Rapid Transit Company in developing its new type of cars while engineer of car construction for that company.

## NEW ADVERTISING LITERATURE

**Edison Storage Battery Company, Orange, N. J.:** Bulletin 819 on Edison electric portable lighting outfits.

**Sterling Motor Truck Company, Milwaukee, Wis.:** A new publication, "Driver Dan, the Sterling Man," of interest to truck users.

**Walter A. Zelnicker Supply Company, St. Louis, Mo.:** Bulletin No. 221, listing offerings in rails, locomotives, cars, cranes, pipe, piling and tanks.

**Spray Engineering Company, Boston, Mass.:** A bulletin describing its Spraco pneumatic painting equipment. This is a further development of the Spraco paint gun which was recently developed.

**Leonard Bundy Electric Company, Cleveland, Ohio:** A bulletin descriptive of its safety-type knife switches, panelboards, cabinets, etc. It is also distributing a bulletin descriptive of knife switches only.

**Society for Electrical Development, Inc., New York, N. Y.:** A bulletin, "Aims and Achievements." This is a brief summary of what the society is accomplishing for its members and for the entire electrical industry. This bulletin describes just what this society is, how it has grown, what its work includes, its members, its officers and committees.

**Ohio Brass Company, Mansfield, Ohio:** Pamphlet descriptive of the O-B cam tip for overhead line material, with views of trolley frogs, crossovers, section insulators, etc., fitted with these cam tips, also illustration showing method of attaching wire to these clips. The pamphlet is entitled "Saving Time on the Line."

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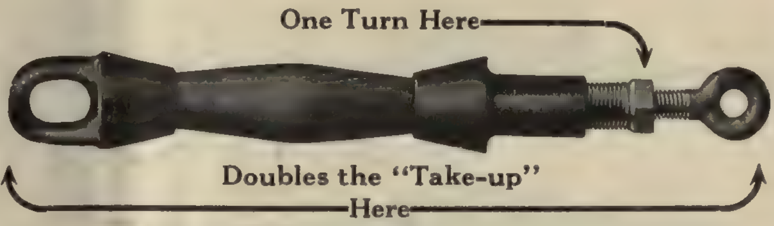

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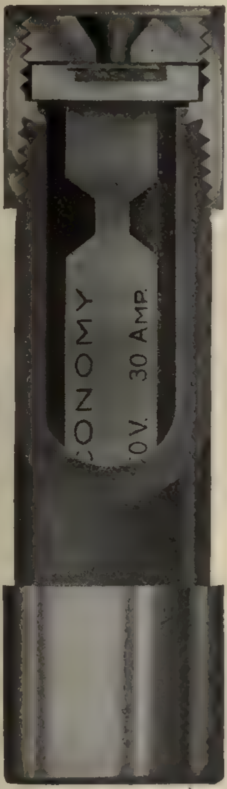

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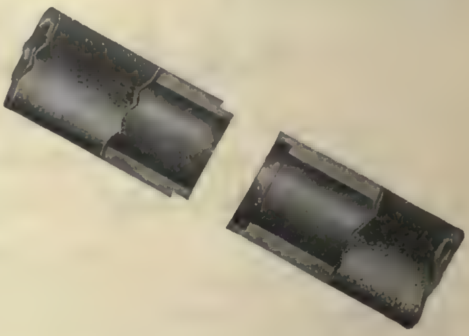

WHEN moisture gets into an underground cable duct you can expect trouble any minute. It's a tremendously difficult proposition to lay a moisture-proof cable conduit line with clay ducts. Because cracked sections are easily installed when the boss isn't looking—and moisture gets in.

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Johns-Manville Fibre Conduit is permanently moisture-proof from end to end—joints and all. And the interior surface at the joints is just as smooth as in the middle of a section.

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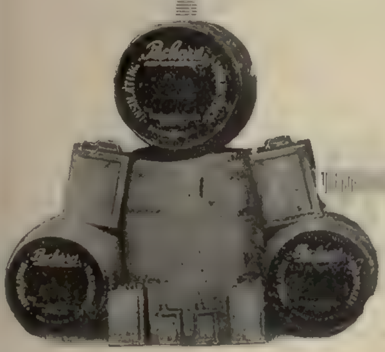

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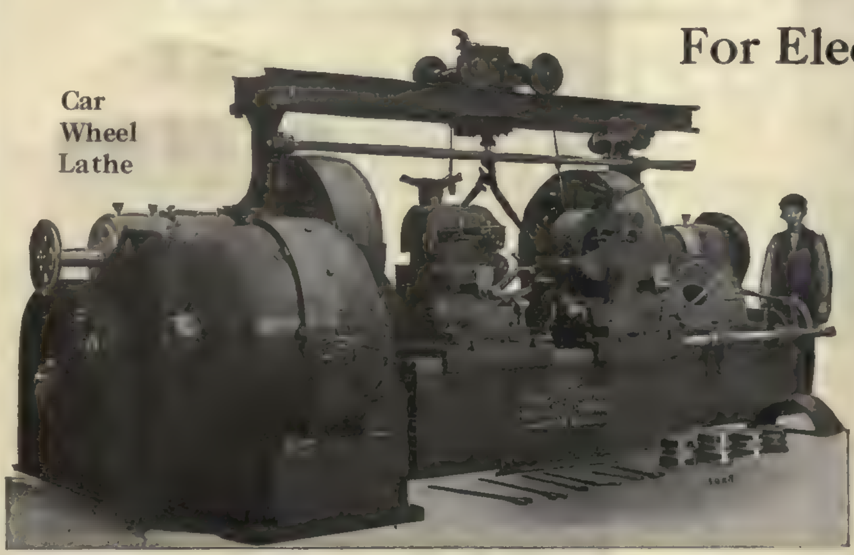

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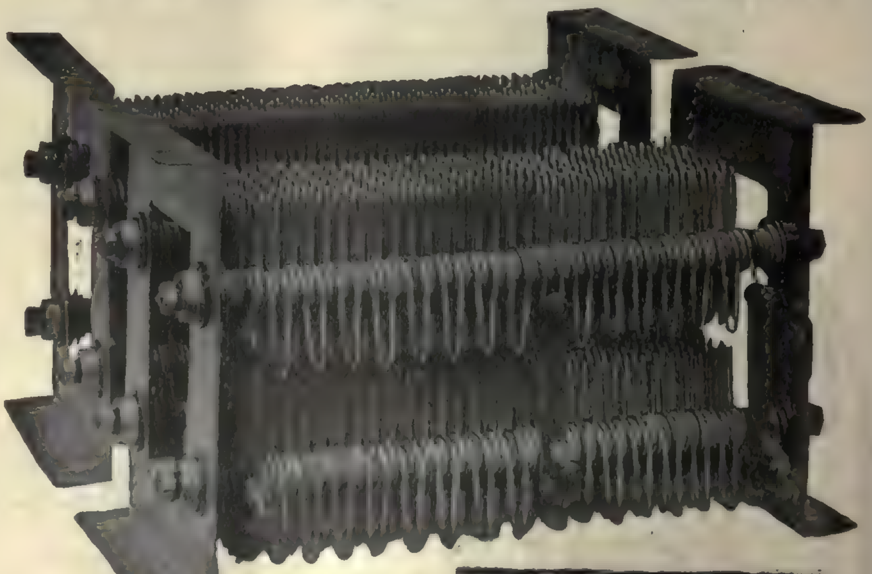

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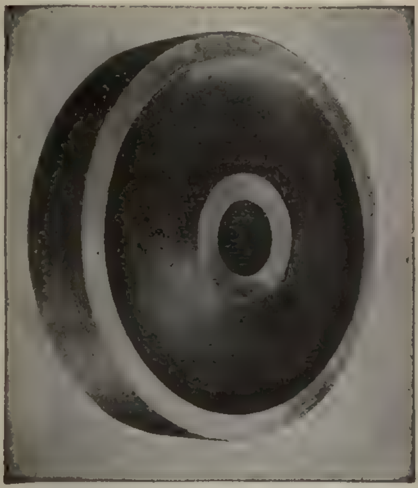

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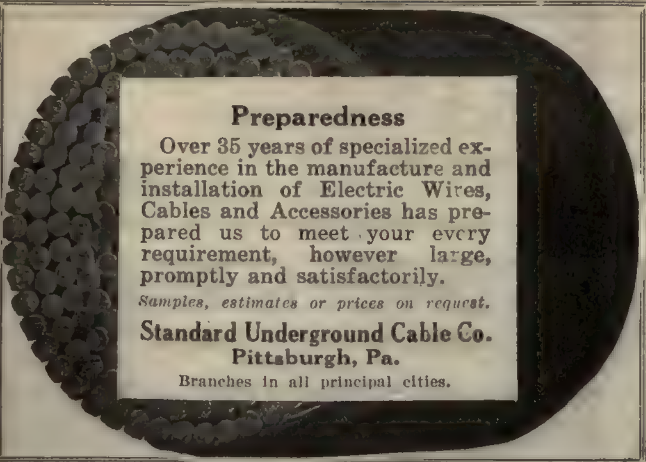

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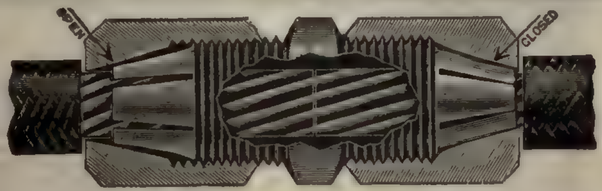

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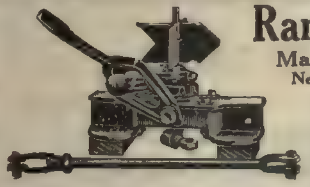

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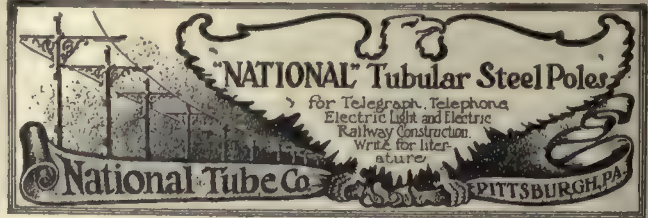
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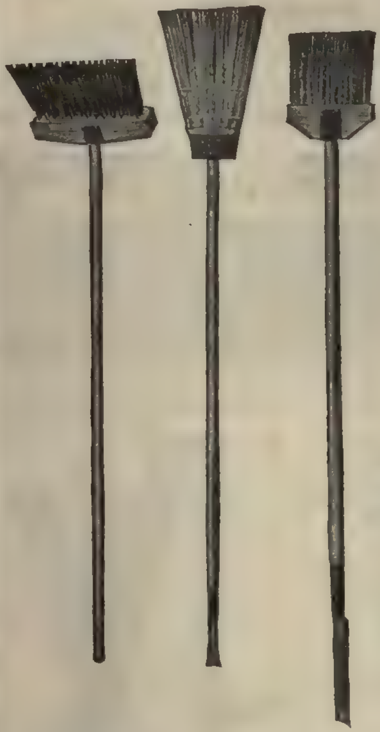

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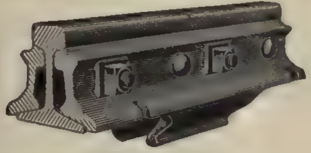

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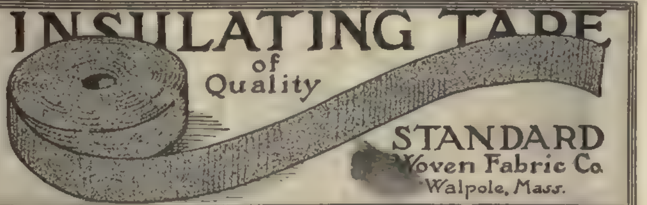

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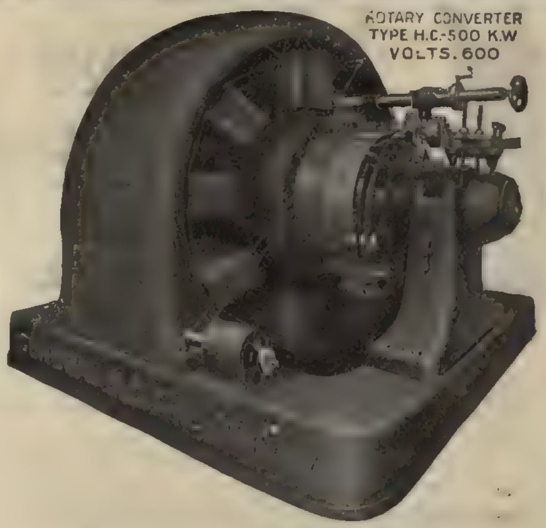

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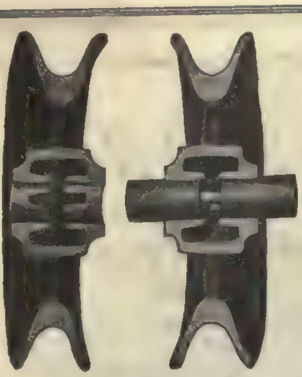

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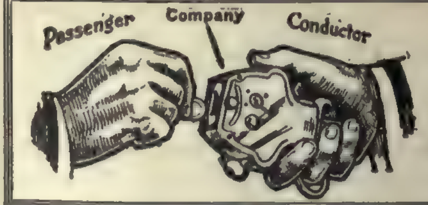


**Direct Automatic Registration**
By the
**Passenger**
Rooke Automatic Register Co.
Providence, R. I.

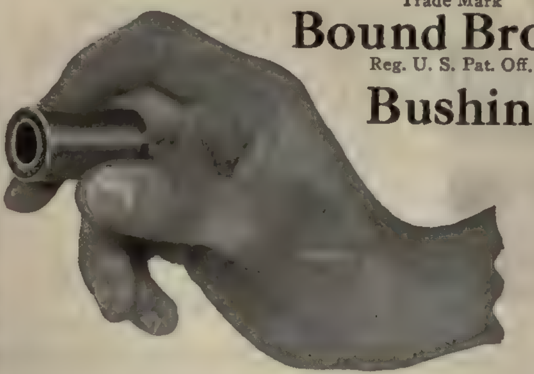
Use them in your terminals—
**PEREY TURNSTILES or PASSIMETERS**
*Faster than the ticket seller*
**Perey Manufacturing Co., Inc.**
30 Church Street, New York City

**The Best Shade Rollers for Cars**

SPECIAL shade rollers for cars, that will last and give satisfaction for years, and yet cost but little more than the poorest you can buy, are made by the Stewart Hartshorn Co., E. Newark, N. J. This company is by far the largest shade roller manufacturer in the world. It is able to give high quality at lower prices because of the enormous output. Write for catalog, stating wants. You are always protected when you buy shade rollers if they bear the signature Stewart Hartshorn

**A Recessed**

Trade Mark
**Bound Brook**
Reg. U. S. Pat. Off.
**Bushing**



This is a close-up of a Bound Brook trolley wheel graphite bushing, showing the neat groove recessed in each end for the insertion of graphite to take care of any end thrust. The graphite placed in these recesses goes through the same careful course of thorough preparation, as the graphite within the casting.

All genuine graphited "Oil-less" Bearings have always been made at Bound Brook, N. J., in the United States of America, by the

**Bound Brook Oil-less Bearing Co.**
FORMERLY
**Graphite Lubricating Company**

**MASON SAFETY TREADS**—prevent slipping and thus obviate damage suits.

**KARBOLITH CAR FLOORING**—for steel cars is sanitary, fireproof and light in weight.

**STANWOOD STEPS**—are non-slipping and self-cleaning.

Above products are used on all leading railways. For details address

**AMERICAN MASON SAFETY TREAD CO.**
Main Offices: Lowell, Mass.
Branch Offices: Boston New York City, Chicago, Philadelphia, Kansas City, Cleveland, St. Louis.

**UNIVERSAL ANTI-SLIP TREADS**
cars and station steps.

**Universal Safety Tread Company**
Waltham, Mass.

**The "Hycap-Exide" Battery**
for
**STORAGE BATTERY STREET CARS**
**THE ELECTRIC STORAGE BATTERY CO**
PHILADELPHIA

**S-W Shim Slack Adjusters Save Brakeshoes and Labor**

SMITH-WARD BRAKE COMPANY, Inc.
17 Battery Place, New York

**Trolley Wheel Shortage**

The copper and bronze shortage does not decrease the necessity of trolley wheels, but increases the difficulty in obtaining them. Here is the answer. Buy from stock.

Our trolley wheel stock contains all standard sizes of wheels for every service. They are all made of high grade material and constructed to give maximum life at minimum cost.

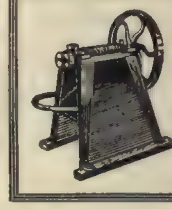
Our stock is your protection against shortage. Make use of it.

**NUTTALL**
PITTSBURGH

**The Kalamazoo Trolley Wheels**

have always been made of entirely new metal, which accounts for their long life WITHOUT INJURY TO THE WIRE. Do not be misled by statements of large mileage, because a wheel that will run too long will damage the wire. If our catalogue does not show the style you need, write us—the LARGEST EXCLUSIVE TROLLEY WHEEL MAKERS IN THE WORLD.

**THE STAR BRASS WORKS**
KALAMAZOO, MICH., U. S. A.



Saved from the Ashes as many tickets are, means nickels loss to you. Avoid the risk.

Patten Ticket Destroyer is used right in the office under the eyes of trustworthy employes.

It mutilates beyond redemption.
Scrap sold will pay for the machines.

*Ask us for Circular J.*

**PAUL B. PATTEN CO.**
78 Lafayette St., Salem, Mass. U.S.A.

**VENTILATORS**

**Globe Ventilator Co.**
Troy, N. Y.

**Don't Let the Snow Eat Your Revenues**

Get your order in *now* for the

**ROOT**
**Spring Scraper**

Made in several sizes to fit any car. The spring principle enables the scraper to pass over all conditions of track, high centers, switches, frogs, crossings, etc. By installing these scrapers on your cars NOW you can keep your schedules unbroken when the snows come.

***Send in your order today and get prompt delivery***

**Root Spring Scraper Co.**
Kalamazoo, Michigan

**Holden & White Inc.**

**Electric Railway Sales Distributors for:**

Wasson Air-Retrieving Trolley Bases. (U. S.)
Garland Ventilators.
Perry-Hartman Self-Centering Center Plates and Anti-Friction Side Bearings.
Watson Car Lighting Regulator.
Anderson Brake Slack Adjusters.

**Chicago District Representatives for:**

Drew Line Material.
Columbia Car & Shop Equipment.
Miller Trolley Shoe.
Lincoln Rail Bonding and Bonds.

**1508 Fisher Building CHICAGO**

**The Baldwin Locomotive Works**

**Philadelphia, Pa.**

**ELECTRIC MOTOR and TRAILER TRUCKS**

The American Trade Mark represents a guarantee of Satisfactory Service. ALL MOTOR AND GENERATOR BRUSHES recommended by us are covered by that guarantee.

**AMERICAN CARBON & BATTERY WORKS** E. ST. LOUIS, ILL.
OF NATIONAL CARBON CO., INC.

**"Boyerized" Products Reduce Maintenance**

Bemis Trucks
Case Hardened Brake Pins.
Case Hardened Bushings
Case Hardened Nuts and Bolts
Manganese Brake Heads
Manganese Transom Plates
Manganese Body Bushings
Bronze Axle Bearings

Bemis Pins are absolutely smooth and true in diameter. We carry 40 different sizes of case hardened pins in stock. Samples furnished. Write for full data.

**Bemis Car Truck Co., Springfield, Mass.**

**VAN DORN COUPLERS**

are made for every condition and requirement. M. C. B. Pin and Link, Car and Air, in all sizes and types.

**VAN DORN COUPLER CO.**
**2325 So. Pauling St., Chicago, Ill.**

**UNION SPRING & MFG. CO.**
**SPRINGS**
COIL AND ELLIPTIC
**M. C. B. Pressed Steel Journal Box Lids**
General Office: First Nat'l Bank Bldg.
PITTSBURGH, PA.
Works: New Kensington, Pa.
50 Church St., New York. 1204 Fisher Bldg., Chicago, Ill.
Missouri Trust Bldg., St. Louis, Mo.

"Trade Mark Reg. U. S. Pat Off."

**Samson Spot Waterproofed Trolley Cord**

Made of fine cotton yarn braided hard and smooth. Inspected and guaranteed free from flaws. Proved to be the most durable and economical. Samples and information gladly sent.

1 **SAMSON CORDAGE WORKS, BOSTON, MASS.**

STUCKI
SIDE BEARINGS

are truly frictionless. The roller instead of turning on a pin rolls freely like a rolling pin.

A. Stucki Co.
Oliver Bldg.
Pittsburgh, Pa.

LONGWEAR BUSHINGS
For Brake Gear

Hardened
Steel
Accurate
Uniform

also
LONGWEAR
BRAKE PINS
to
Specifications

E. G. Long Company
50 Church Street New York

STARTLING

are their advantages. Absolutely PROOF against vibration. They have been tested out on over 120 Electric Railways already. Join the wise ones.

*Get our catalogs.*

Roller Lock Nut Co.
61 Broadway, New York

*Ball Bearings for heavy loads*

For heavy loads Gurney Bearings are best because they have larger load capacities than any other ball bearings that money can buy. This gives a larger factor of safety and longer life.

*To save coal, install ball bearing equipment.*

*To insure reliable operation specify Gurney Bearings.*

171

GURNEY
BALL BEARINGS

Gurney Ball
Bearing Co.
Conrad Patent Licensee
Chicago, Ill.
Jamestown, N. Y.
New York City

"Zero" "Motor"

STANDARD for a THIRD of a CENTURY

The Mileage Babbitt

Post's ZERO and MOTOR metals have been standard for a third of a century in shops where mileage records are attained. Nothing but highest grade of virgin raw materials used.

*Write us for details.*

E. L. Post & Co., Inc., Sole Mfrs., 50 Cliff St., New York City

# SEARCHLIGHT SECTION

## IMMEDIATE SHIPMENT

1—500 KW. General Electric Curtis steam turbine, 3 ph., 60 cy., 1800 rpm., 2300 volts, 150 lb. steam pressure, vertical type.
1—500 K.W. Westinghouse Horizontal Turbo Generating Unit wound for 3 phase, 60 cycle, 2300 volts, speed 3600 rpm., condensing duty.

**25 Cycle Rotary Converters**

2—150 KW. General Electric type T.C., 4-150-750, 25 cycle, 3 ph., 575 volt, rotary converters, 750 rpm., complete with end play and speed limit device.

**200 Kilowatt 60 Cycle Rotary Converters**

1—200 KW. Westinghouse 3 ph., 60 cy. rotary converters, 550 volts, 720 rpm., complete with 4—100 KW. Westinghouse Scott connected oil insulated transformers, 10,000/9500 volts prim., 430/362 volts secy.
1—150 KW. Westinghouse 3 ph., 60 cy., rotary converter, 550 volts, 720 rpm.

**Transformers**

3—750 KVA. General Electric oil filled self cooled transformers, 4400/281 volts, with 4400-4290-4180-4070-2200-2090-1980 taps in the primary.
3—500 KW. General Electric, 60 cy., single phase transformers, 66,000 volts primary, 4400/2200 volts secondary.
3—375 KVA. Allis Chalmers O. I. S. C. indoor type transformers, 25 cy., 2300 v., 367 v. secy.
3—350 KVA. General Electric, type H, 60 cy., transformers 2400/2300/2200 v. prim., 200/400 v. secy.
1—100 KVA. General Electric, type H, 60 cy. transformer, 4600 volts prim., 115-230 volts secy.
4—100 KW. Westinghouse, oil insulated, Scott connected transformers, 10,000/9500 v. prim., 430/362 v. secy.
3—75 KW. Westinghouse 60 cy. transformers, 2200 v. prim., 110/220/440 v. secy.
3—50 KVA. General Electric type H, 60 cy. transformers, 900/1000/16000 v. prim. Y., 230/460 v. secy.
Also a stock of smaller sized transformers.

**IMMEDIATE DELIVERY**

**ARCHER & BALDWIN, Inc.**
**114-118 Liberty Street New York City**
TELEPHONE 4337-4338 RECTOR

## THREE

1500 KVA. 25 Cycle

Single Phase

## WESTINGHOUSE TRANSFORMERS

Oil Insulated Water Cooled

33,000/2,300 Volts

**MACGOVERN & COMPANY**
INC.
114 Liberty Street New York, N. Y.

FOR SALE

## New 300 K.W. Rotary

Complete G.E. Rotary, 1200 R.P.M., 600 V., 3 Ph., 60 Cyc., Field Winding C.W. 150% 2 Hour Overload. Weight 13,000 Lbs. Type TC. Six Poles. 500 Amperes, includes Transformers, Switchboard, etc., all complete for substation.

Transformers, Type HR, 100 KVA, 60 Cyc. Primary Volts 15000/26000Y, Secondary Volts 370. Amps. at Full Voltage 270 each. Trans. designed for Y connection on 26,000 V. cir. Taps provided for additional approximate voltages—Primary 14400/13800/13200/1300. Secondary 50% starting. Oil cooled. Net weights Trans. 4800 Lbs. Oil 1150. Height over leads 90 in. Floor space 46 x 31 ins. 15% Inherent Reactance. This substation now installed and will be demonstrated on actual working load for customer. Immediate delivery. Cash. Price complete $5,500.

## West. Interurban For Sale

52 Ft. 3 Compart. Interurban Car. 306 Motors. HL Control in fine shape. Brand new Pinions and Motor Bearings throughout. All overhauled. Can be demonstrated in service at place of delivery. Do not miss this car offering when cars are scarce. (Ind.)
FS1588, Elec. Ry. Journal.

Seven 12-bench double truck

## Open Electric Cars

complete except motors and two single-truck

## Closed Electric Cars

complete with motors. Specifications and full particulars upon request. Address, Purchasing Agent,

**E. St. Louis Railway Company**
East St. Louis, Illinois

# If there is anything you want—

or something you don't want that *other* readers of this paper can supply—or use—advertise in the

## Searchlight Section

*NOW*— is the time to offer good second-hand equipment or machinery for sale. The demand is great for good plant for immediate delivery. That's why you should advertise NOW.

*NOW*— or any other time, use the Searchlight Section for advertising

Agencies Wanted
Agents Wanted
Auction Notices
Buildings For Sale
Business Opportunities
Civil Service Opportunities
Contracts To Be Let
Contracts Wanted
Educational Courses
Employment Agencies
Exchanges
For Rent Items
Franchises
Industrial Sites
Miscellaneous Wants
New Industries Wanted
Partners Wanted
Patents For Sale
Patent Attorneys
Plants For Sale
Positions Vacant
Positions Wanted
Property For Sale
Receivers' Sales
Representatives Wanted
Salesmen Wanted
Work Wanted
Etc., Etc., Etc.

## For Sale—*for Immediate Delivery*

# Pinions

54—G.E. 70-80-90 Pinions, 17 teeth, 5″ face, standard dimensions, without washer slots, standard grade.
390—G.E. 70-80-90 Pinions, 17 teeth, 5″ face, standard dimensions, with washer slots, standard grade.
79—G.E. 70-80-90 Pinions, 15 teeth, standard grade and standard dimensions.
6—G.E. 70-80-90 Pinions, 16 teeth, standard grade and standard dimensions.
287—G.E. 57 Pinions, 16 teeth, standard grade and standard dimensions.
395—G.E. 57 Pinions, 16 teeth, specially oil tempered.
61—G.E. 1000 Pinions, 17 teeth, standard grade.
84—G.E. 1200 Pinions, 17 teeth, standard grade.
236—W.H. 101 Pinions, 17 teeth, standard dimensions and standard grade.
30—W.H. 101 Pinions, 17 teeth, specially oil tempered.
195—W.H. 38-56-68 Pinions, 14 teeth, 2½″ standard bore.

# Gears

2—G.E. 57 Split Gears, 8 bolt type, 69 teeth, bored for 4½″ axle.
5—G.E. 58 Split Gears, 8 bolt type, 69 teeth, 4″ bore.
2—G.E. 58 Split Gears, 8 bolt type, 69 teeth, 4½″ bore.
4—G.E. 1000 Solid Gears, machine cut steel casting, 67 teeth, 4½″ bore.
1—G.E. 58 Split Gear, 8 bolt type, 65 teeth, 4″ bore.
23—G.E. 800 Split Gears, 8 bolt type, 3⅝″ bore.
9—G.E. 800 Split Gears, 8 bolt type, 3¾″ bore.
1—W.H. 68 Solid Gear, machine cut steel castings, 68 teeth, 4½″ bore.
3—W.H. 56 Split Gears, 8 bolt type, 64 teeth, 3¾″ bore.
3—W.H. 56 Split Gears, 8 bolt type, 64 teeth, 4″ bore.
2—W.H. 68 Split Gears, 8 bolt type, 62 teeth, 3¾″ bore.
1—W.H. 68 Split Gear, 8 bolt type, 62 teeth, 4″ bore.
3—G.E. 67-1000 Solid Gears, 67 teeth, 3¾″ bore.
4—W.H. 101 Split Gears, 8 bolt type, 65 teeth, 4″ bore, ¾″ keyway.
1—W.H. 68 Solid Gear, 66 teeth, machine cut steel casting, 3⅞″ bore.
51—W.H. 12 Solid Gears, 68 teeth, 3⅞″ bore, machined from Carnegie rolled blanks.
1—G.E. 67-1000 Solid Gear, 69 teeth, 4″ bore, machine cut from steel casting.
2—G.E. 70-80-90 Solid Gears, 69 teeth, 5½″ bore, machine cut from steel castings.
2—G.E. 70-80-90 Solid Gears, 69 teeth, 5½″ bore, standard grade, untreated.
2—G.E. 70-80-90 Solid Gears, 69 teeth, 5½″ bore, case hardened.
9—G.E. 67-1000 Solid Gears, 67 teeth, 4½″ bore, oil treated, machined from Carnegie rolled blanks.

**W. R. Kerschner Company, Inc.**
50 Church St., New York, N. Y.

# SEARCHLIGHT SECTION

## Get your Wants into the Searchlight

### ADVERTISING RATES

Under "Positions Wanted," including Salesmen looking for new connections, Evening Work Wanted, etc., undisplayed advertisements cost **three cents a word,** minimum charge 50 cents an insertion, payable in advance; less 10% if one payment is made in advance for 4 continuous insertions.

Under "Positions Vacant," including Agents and Agencies Wanted, Representatives Wanted, Salesmen Wanted, Partners Wanted, Business Opportunities, Employment Agencies, and Miscellaneous For Sale, For Rent, and Want ads; also Auction Notices, Receivers' Sales, Machinery and Plants For Sale or Wanted, undisplayed advertisements set solid in one paragraph, cost **five cents a word,** minimum charge $1.50 an insertion.

Machinery advertisements (undisplayed) set with a paragraph for each item, or tabulated, 30 cents a line, minimum 5 lines.

If replies are in care of any of our offices, allow five words for the address.

All advertisements for bids (Proposals) cost $2.40 an inch.

**ADVERTISEMENTS IN DISPLAY TYPE**

cost as follows for single insertions:

| | | | |
|---|---|---|---|
| 1/16 p. (1⅛x3⅜ ins.) | $5.00 | 1 in. (1x2 1/16 ins.) | $3.00 |
| ⅛ p. (2⅜x3⅜ ins.) | 10.00 | 4 inches (4x2 1/16 ins.) | 11.60 |
| ¼ p. (5x3⅜ or 2⅜x7 ins.) | 20.00 | 8 inches (8x2 1/16 ins.) | 22.40 |
| ½ p. (10¼x3⅜ or 5x7 ins.) | 40.00 | 15 inches | 40.50 |

For space to be used within one year, to be divided to suit requirements of advertiser, provided some space is used at least once a month following first insertion:

| | | | |
|---|---|---|---|
| 1 page | $80 a page | 18 pages | $56 a page |
| 3 pages | 72 a page | 26 pages | 52 a page |
| 6 pages | 64 a page | 32 pages | 50 a page |
| 9 pages | 62 a page | 40 pages | 48 a page |
| 12 pages | 58 a page | 52 pages | 45 a page |

In replying to advertisements, do NOT enclose original testimonials, or anything that you may want returned. State your qualifications in as concise and neat a manner as you can and enclose COPIES of testimonials. In machinery ads, use a local name or address if possible so that readers can wire direct and get quick replies.

FOR SALE
300 "A" Frame
and
One Square, Black Iron Archbald

**Flexible Towers**

in exceptionally good condition, having been painted during last Spring and never been in service. "A" Frame Tower weighs complete 1800 lbs., square tower 3700 lbs. complete. For further detailed information

Address PURCHASING AGENT
Alabama Power Company
Birmingham, Alabama

**Generating Units**
FOR SALE

Two 500-hp. Bass Corliss cross-compound Steam Engines direct connected to Westinghouse Generators, 375 kw., 550-volts.

First-class running condition.

Will be sold cheap.

**Federal Iron & Steel Company**
Newark, N. J.

CAR BARGAINS

OPEN and CLOSED
MOTOR and TRAIL

*Write for Price and Full Particulars to*

ELECTRIC EQUIPMENT Co.
601 Commonwealth, Bldg Phila Pa

IMMEDIATE SHIPMENT

100 tons of 62 lb. Shanghai rails, together with bars, rails practically as good as new, ready for quick shipment.

Also one direct connected Ridgway Dynamo and Engine, 200 volt. 550 KW., as good as new. Wire for prices.

M. K. FRANK
Frick Building, Pittsburgh, Pa.

RAILS CARS
**Dollar-Saving Bulletin**
Send for the last one, No. 220—the best 2c. investment you ever made.
ZELNICKER IN ST. LOUIS
EQUIPMENT MACHINERY

IMMEDIATE SHIPMENT

1—300 K.W. Westinghouse, compound wound, 3 bearing, belt-driven

**Generator**

speed 435 R.P.M., 550 volts.

LEO A. PHILLIPS
Steam & Electrical Equipment
90 West Street New York City

FOR SALE—IMMEDIATE SHIPMENT

**Entire Power House Equipment**

AT PITTSFIELD, MASSACHUSETTS

Consisting of the following:

2—500 Kw. D.C. Generators, dir. con. to Cross compound engines.
1—325 Kw. D.C. Generator, dir. con. to Knowleson & Kelley compound Corliss engine.
1—225 Kw. D.C. Generator, dir. con. to Knowleson & Kelley Corliss engine.
6—150 H.P. horizontal return tubular Dillon Boilers. All pumps, condensers and feed pumps. Piping.

For prices and further particulars apply to

SCHWARTZ & LAND
207 Centre St., New York, N. Y.

**85 lb. A. S. C. E. Relayers**

16,000 tons—with Angle Bars to match. Available immediate shipment and centrally located.
We positively own these Rails and offer same in carload lots and over.
25,000 tons—Relayers—sizes 25 lb. to 100 lb., in stock our Pittsburgh yards and vicinity.
Immediate shipment guaranteed and prices very attractive.
Carload and less than carload inquiries and orders solicited.
Rails cut to length for structural purposes.
Frogs, Switches, Bolts, Nuts, Spikes and all Accessories.

L. B. FOSTER COMPANY
Park Bldg. Pittsburgh, Pa.

Immediate Shipment

1 500 KW., 550 V. D. C., 320 RPM., Westinghouse Type "M" compound wound generator.

DUQUESNE Electric & Mfg Co.

Bessemer Bldg. Pittsburgh, Pa.
Marshall Bldg. Cleveland, Ohio

CLEVELAND ARMATURE WORKS
Cleveland, Ohio

**Everything in the Line of Repairs to Electrical Machinery**

Complete Armatures, New Armatures, Rewound Armature Cores, Armature Shafts, Armature Coils, Fields and Commutators.

Established 22 Years.

### MISCELLANEOUS WANTS

**Wanted at Once**

For immediate shipment any quantity of battery lead plates, sediment scrap copper and wire, brass and all other grades of scrap material. Write to us today for our prices. National Metal & Rubber Co., 31 India Wharf, Boston, Mass.

# SEARCHLIGHT SECTION

## POSITIONS WANTED

ENGINEER ways and structures. Practical man, 10 years' experience on up-to-date roads with modern construction. Has engineering training. Has charge track, overhead, high tension work, etc. Best references. Married, age 30. (W. Va.) PW1595, Elec. Ry. Journal, Cleveland.

MARRIED man, 35 years of age with 20 years' experience in all departments of electric railways, past 7 years as superintendent of transportation, wishes a position in transportation department. Can give best of references from past and present employers. (N. Y.)—PW 1603, Elec. Ry. Journal, N. Y. C.

OPERATING executive, age 44, with 22 years' experience, open for engagement. Have thorough understanding of effective organization and progressive, practical working methods that have brought the largest results to street and interurban railway companies, and to meet rapid changing conditions successfully. Good reasons for wanting change. Best of references. (Miss.) PW1599, Elec. Ry. Journal, Chicago.

PURCHASING agent of seventeen years' experience, now employed, desires position with large property; thoroughly competent. Familiar with organizing and conducting storeroom. Can give A1 references from present and past employers as to character and ability. (Ala.) PW1585, Elec. Ry. Journal, Philadelphia.

### ADVERTISEMENTS ARE KEYED

to our office nearest the advertiser. The advertiser's location is indicated by the state abbreviation preceding the box number.

### IN REPLYING

be careful to put on envelope the key number in the ad. and also local address of office to which reply is sent.

239 West 39th St., New York.
1570 Old Colony Bldg., Chicago.
657 Leader-News Bldg., Cleveland.
935 Real Estate Trust Bldg., Phila.
501 Rialto Bldg., San Francisco.

### IMPORTANT

**Original letters of recommendation or other papers of value should not be enclosed to unknown correspondents—send copies.**

## POSITIONS VACANT

EXPERIENCED track man who can personally direct track welding operations. Prefer a man with engineering training. State experience and salary wanted. (N. Y.)—P1606, Elec. Ry. Journal, N. Y. C.

WANTED—Man over 30, qualified in general office railway accounting. State age, experience and salary expected. (Ind.) P1598, Elec. Ry. Journal, Chicago.

## POSITIONS VACANT

### WANTED

**Electric Light and Street Railway**

### SUPERINTENDENT

In city of 40,000 in Cuba. Young married man who has had actual experience as superintendent of electric light and street railway property. Must be energetic, healthy and strictly temperate. Excellent opportunity for advancement for right man. Give full details as to education, experience, personality and references. Knowledge of Spanish language desirable but not essential if successful applicant will devote himself to learning it quickly. Healthy climate. (Can.)

**P. 1604, Elec. Ry. Journal, N. Y. C.**

## EMPLOYMENT AGENCIES

**Correspondence Service**

The undersigned provides a confidential service designed to locate openings through correspondence for men earning not less than $2,500 and up to $25,000; all lines. Not an employment agency, but a constructive, initiative service, covering individual negotiations. Established 1910. Complete privacy assured; present connections in no way jeopardized. Send name and address only for explanatory details. R. W. Bixby, H1 Niagara Square, Buffalo, N. Y.

# SERVICE VALUE

**Scrap value** for material on your shelves or in your yards is not enough. If it is operative, the roads that need it will pay **service value** for it.

The Searchlight Section of the Electric Railway Journal will find these roads for you.

Manufacturers who accept old equipment in part payment of new products can dispose of this promptly by advertising in the Searchlight Section of the Electric Railway Journal.

Machinery used in manufacturing and displaced by more modern tools can be sold at a fair price by advertising it in the Searchlight Section.

Wide-awake dealers, agents or representatives can be secured through little Searchlight "Want" ads.

Manufacturing sites, partners, help, capital—anything that anybody in the electric railway industry is likely to have for sale or exchange for something else—can be located or disposed of through the Searchlight Section.

The cost of putting your Wants in this projector is very slight, whether for a man, for a job, or for a market.

**Searchlight Section, Electric Railway Journal**

# WHAT AND WHERE TO BUY

## Equipment, Apparatus and Supplies Used by the Electric Railway Industry with Names of Manufacturers and Distributors

**Acetylene Service and Apparatus.**
Oxweld Acetylene Co.

**Advertising, Street Car.**
Collier, Inc., Barron G.

**Air Cleaners and Rectifiers.**
Horne Mfg. Co.

**Alloys, Steel and Iron. (See also Bearings and Bearing Metals.)**
Titanium Alloy Mfg. Co.

**Anchors, Guy.**
Electric Service Supplies Co.
Holden & White, Inc.
Johns-Manville Co., H. W.
Ohio Brass Co.
Westinghouse Elec. & M. Co.

**Anti-Climbers.**
Railway Improvement Co.

**Automobiles and Buses.**
Brill Co., The J. G.

**Axle Straighteners.**
Columbia M. W. & M. I. Co.

**Axles, Car Wheel.**
Bemis Car Truck Co.
Brill Co., The J. G.
Carnegie Steel Co.
National Tube Co.
St. Louis Car Co.
Standard Steel Works Co.
Westinghouse Elec. & M. Co.

**Babbitting Devices.**
Columbia M. W. & M. I. Co.

**Badges and Buttons.**
Electric Service Supplies Co.
International Register Co., The

**Bankers and Brokers.**
National City Co.

**Batteries, Dry.**
Johns-Manville Co., H. W.

**Batteries, Storage.**
Electric Storage Battery Co.

**Bearings & Bearing Metals.**
Bemis Car Truck Co.
Columbia M. W. & M. I. Co.
Eureka Co.
General Electric Co.
Kerschner Co., Inc., W. R.
Long Co., E. G.
More-Jones, B. & M. Co.
Post & Co., E. L.
St. Louis Car Co.
Westinghouse Elec. & M. Co.

**Bearings, Center and Roller Side.**
Baldwin Locomotive Works.
Holden & White, Inc.
Stucki Co., A.

**Bearings, Oilless, Graphite, Bronze and Wood.**
Bound Brook Oil-less Bearing Co.

**Bearings, Roller and Ball.**
Gurney Ball-Bearing Co.
Railway Roller Bearing Co.

**Bells and Gongs.**
Brill Co., The J. G.
Columbia M. W. & M. I. Co.
Electric Service Supplies Co.
St. Louis Car Co.

**Benders, Rail.**
Niles-Bement-Pond Co.
Zelnicker Sup. Co., W. A.

**Boilers.**
Babcock & Wilcox Co.

**Boiler Cleaning Compounds.**
Dearborn Chemical Co.
Johns-Manville Co., H. W.

**Boiler Coverings.**
Johns-Manville Co., H. W.

**Boiler Tubes.**
National Tube Co.

**Bond Testers.**
American Steel & Wire Co.

**Bonding Apparatus.**
American Steel & Wire Co.
Electric Railway Improvement Co.
Electric Service Supplies Co.
Ohio Brass Co.
Oxweld Acetylene Co.

**Bonds, Rail.**
American Steel & Wire Co.
Electric Railway Improvement Co.
Electric Service Supplies Co.
General Electric Co.
Johns-Manville Co., H. W.
Lincoln Bonding Co.
Ohio Brass Co.
Westinghouse Elec. & M. Co.

**Book Publishers.**
McGraw-Hill Book Co., Inc.

**Boring Tools, Car Wheel.**
Niles-Bement-Pond Co.

**Braces, Rail.**
Kilby Frog & Switch Co.

**Brackets and Cross Arms. (See also Poles, Ties, Posts, Etc.)**
American Bridge Co.
Bates Expanded Steel Truss Co.
Electric Railway Equip. Co.
Electric Service Supplies Co.
Hubbard & Co.
Lindsley Bros. Co.
Ohio Brass Co.

**Brake Adjusters.**
Holden & White, Inc.
Smith-Ward Brake Co.

**Brake Shoes.**
Amer. Brake Shoe & Fdry. Co.
Brill Co., The J. G.
Columbia M. W. & M. I. Co.
Long Co., E. G.
St. Louis Car Co.

**Brakes, Brake Systems and Brake Parts.**
Bemis Car Truck Co.
Brill Co., The J. G.
Columbia M. W. & M. I. Co.
General Electric Co.
Holden & White, Inc.
Horne Mfg. Co.
Long Co., E. G.
St. Louis Car Co.
Westinghouse Trac. B. Co.

**Bridges and Buildings.**
American Bridge Co.

**Brooms, Track, Steel or Rattan.**
Paxson Co., J. W.
Zelnicker Supply Co., W. A.

**Brush Holders.**
Anderson Mfg. Co., A. & J. M.
Columbia M. W. & M. I. Co.
Eureka Co.

**Brushes, Carbon.**
American Carbon & Battery Co.
General Electric Co.
Jeandron, W. J.
Morgan Crucible Co.
Westinghouse Elec. & M. Co.

**Brushes, Graphite.**
Dixon Crucible Co., Jos.

**Bunkers, Coal.**
American Bridge Co.

**Bushings, Case Hardened and Manganese.**
Bemis Car Truck Co.

**Bushings, Fibre.**
Diamond State Fibre Co.

**Bushings, Graphite and Wooden**
Bound Brook Oil-less Bearing Co.

**Cables. (See Wires and Cables.)**

**Carbon Brushes. (See Brushes, Carbon.)**

**Car Equipment. (For Fenders, Heaters, Registers, Wheels, etc.—See those headings.)**

**Car Trimmings. (For Curtains, Registers, Doors, Seats, etc. — See those headings.)**

**Cars, Passenger, Freight, Express, etc.**
American Car Co.
Brill Co., The J. G.
Kuhlman Car Co., G. C.
St. Louis Car Co.
Stephenson Co., John
Wason Mfg. Co.

**Cars, Second Hand.**
Electric Equipment Co.
Kerschner Co., Inc., W. R.

**Cars, Self-Propelled.**
Electric Storage Battery Co.
General Electric Co.

**Castings, Brass, Composition or Copper.**
Anderson Mfg. Co., A. & J. M.
Columbia M. W. & M. I. Co.
Eureka Co.
Frankel Connector Co.
Horne Mfg. Co.
More-Jones B. & M. Co.

**Castings, Gray Iron and Steel.**
Amer. Brake Shoe & Fdry. Co.
American Bridge Co.
American Steel Foundries.
Bemis Car Truck Co.
Columbia M. W. & M. I. Co.
Horne Mfg. Co.
Long Co., E. G.
St. Louis Car Co.
Standard Steel Works Co.
Union Spring & Mfg. Co.

**Castings, Malleable and Brass.**
Amer. Brake Shoe & Fdry. Co.
Bemis Car Truck Co.
Columbia M. W. & M. I. Co.
Horne Mfg. Co.
Long Co., E. G.
St. Louis Car Co.

**Catchers and Retrievers, Trolley.**
Electric Service Supplies Co.
Holden & White, Inc.
Horne Mfg. Co.
Kerschner Co., Inc., W. R.
Long Co., E. G.
Ohio Brass Co.
Wood Co., Chas. N.

**Ceiling, Car.—(See Head Lining.)**

**Chemists.**
Little, Inc., Arthur D.

**Circuit Breakers.**
Cutter Electrical & Mfg. Co.
General Electric Co.
Westinghouse Elec. & M. Co.

**Clamps and Connectors for Wires and Cables.**
Anderson Mfg. Co., A. & J. M.
Electric Service Supplies Co.
Frankel Connector Co.
General Electric Co.
Hubbard & Co.
Klein & Sons, Mathias.
Ohio Brass Co.
Westinghouse Elec. & M. Co.

**Cleaners and Scrapers, Track.—(See also Snow-Plows, Sweepers and Brooms.)**
Brill Co., The J. G.
Ohio Brass Co.
Root Spring Scraper Co.

**Clusters and Sockets.**
General Electric Co.

**Coal and Ash Handling.—(See Conveying and Hoisting Machinery.)**

**Coasting Recorders.**
Railway Improvement Co.

**Coil Banding and Winding Machines.**
Columbia M. W. & M. I. Co.
Electric Service Supplies Co.

**Coils, Armature and Field.**
Cleveland Armature Works
Columbia M. W. & M. I. Co.
D & W Fuse Co.
General Electric Co.
Independent Lamp & Wire Co.
Westinghouse Elec. & M. Co.

**Coils, Choke and Kicking.**
Electric Service Supplies Co.
General Electric Co.
Westinghouse Elec. & M. Co.

**Coin-Counting Machines.**
International Register Co., The
Johnson Fare Box Co.

**Commutator Slotters.**
Electric Service Supplies Co.
General Electric Co.
Westinghouse Elec. & M. Co.
Wood Co., Chas. N.

**Commutator Truing Devices.**
General Electric Co.
Jordan Bros., Inc.

**Commutators or Parts.**
Cameron Elec'l Mfg. Co.
Cleveland Armature Works
Columbia M. W. & M. I. Co.
Eureka Co.
General Electric Co.
Long Co., E. G.
Westinghouse Elec. & M. Co.

**Compressors, Air.**
General Electric Co.
Westinghouse Trac. B. Co.

**Condensers.**
General Electric Co.
Westinghouse Elec. & M. Co.

**Conduits, Underground.**
Johns-Manville Co., H. W.

**Connectors, Solderless.**
Frankel Connector Co.
Horne Mfg. Co.

**Controller Regulators.**
Electric Service Supplies Co.

**Controllers or Parts.**
Columbia M. W. & M. I. Co.
Electric Service Supplies Co.
General Electric Co.
Horne Mfg. Co.
Johns-Manville Co., H. W.
Kerschner Co., Inc., W. R.
Westinghouse Elec. & M Co.

**Controlling Systems.**
General Electric Co.
Westinghouse Elec. & M. Co.

**Converters, Rotary.**
General Electric Co.
Westinghouse Elec. & M. Co.

**Conveying and Hoisting Machinery.**
American Bridge Co.
Columbia M. W. & M. I. Co.
Green Engrg. Co.

**Cord, Bell, Trolley, Register, etc.**
Brill Co., The J. G.
Electric Service Supplies Co.
International Register Co., The
Long Co., E. G.
Roebling's Sons Co., John A.
Samson Cordage Works

**Cord Connectors and Couplers.**
Electric Service Supplies Co.
Samson Cordage Works
Wood Co., Chas. N.

**Couplers, Car.**
Brill Co., The J. G.
Long Co., E. G.
Ohio Brass Co.
Van Dorn Coupler Co.
Westinghouse Trac. B. Co.

**Couplings, Conduit.**
Horne Mfg. Co.

**Cranes.—(See also Hoists.)**
Niles-Bement-Pond Co.

**Creosoting. (See Wood Preservatives.)**

**Cross Arms. (See Brackets.)**

**Crossing Foundations.**
International Steel Tie Co.

**Crossing Signals. (See Signals, Crossing.)**

**Crossings, Track. (See Track, Special Work.)**

**Standing the Overload**

What's the usual result of an overload on your car motors or compressors?

A puff of smoke—followed by a trip to the repair shop. You can eliminate these trips by using

**Salamander Fireproof Wire**

motor field, armature and compressor coils. You can't burn out Salamander Wire Coils. We've had them red-hot on test without any breakdown.

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Model 310 Single Phase and D.C. Wattmeter

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All of which means increased efficiency and decreased cost of Brake Maintenance.

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**National Railway Appliance Company**

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Chicago Washington, D. C.

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Tool Steel Gears and Pinions
Johnson Fare Box
Perry Side Bearings
Hartman Centering Center Plates
Wasson Trolley Bases
Garland Ventilator
Electric Arc Welders
High Class Railway Varnishes and Enamels
Elastic Car Waste

Special Agents for
Tool Steel Gear & Pinion Co.
Johnson Fare Box Co.
C. & C. Electric & Mfg. Co.
Holden & White

General Agents for Anglo-American Varnish Co.
Eastern Agents for Union Fibre Co.

# WHAT AND WHERE TO BUY

**Culverts.**
American Rolling Mill Co.
Bark River B. & Culvert Co.
California Cor. Culvert Co.
Canada Ingot & Iron Co., Ltd.
Canton Culvert & Silo Co.
Coast Culvert & Flume Co.
Corrugated Culvert Co.
Delaware Metal Culvert Co.
Dixie Culvert & Metal Co.
Hardesty Mfg. Co., R.
Illinois Corrugated Metal Co.
Independence Culvert Co.
Iowa Pure Iron Culvert Co.
Kentucky Culvert Mfg. Co.
Lee-Arnett Co.
Lone Star Culvert Co.
Lyle Corrugated Culvert Co.
Michigan Bridge & Pipe Co.
Montana Culvert Co.
Nebraska Culvert & Mfg. Co.
Nevada Metal Mfg. Co.
New England Metal Cul. Co.
North East Metal Co.
Northwestern Sheet & I. Wks.
O'Neall Co., W. Q.
Ohio Corrugated Culvert Co.
Pennsylvania Metal Cul. Co.
Road Supply & Metal Co.
Sioux Falls Metal. Cul. Co.
Spokane Corr. Cul. Co.
Tennessee Metal Culvert Co.
Utah Corr. Cul. & Flume Co.
Virginia Metal & Culvert Co.
Western Metal Mfg. Co.
Wyatt Mfg. Co.

**Curtains and Curtain Fixtures.**
Brill Co., The J. G.
Electric Service Supplies Co.
Hartshorn Company, Stewart
Pantasote Co., The
St. Louis Car Co.

**Derailing Devices. (See also Track Work.)**
Cleveland Frog & Crossing Co.

**Destination Signs.**
Columbia M. W. & M. I. Co.
Electric Service Supplies Co.

**Detective Service.**
Wisch Service, P. Edward

**Dispatching Systems.**
Simmen Automatic Ry. Sig. Co.

**Door Operating Devices.**
National Pneumatic Co.

**Doors, Asbestos.**
Johns-Manville Co., H. W.

**Doors and Door Fixtures.**
Brill Co., The J. G.
General Electric Co.
Hale & Kilburn Co.

**Doors, Folding Vestibule.**
National Pneumatic Co.

**Doors & Shutters, Fireproof.**
Kinnear Mfg. Co.

**Doors, Steel Rolling.**
Kinnear Mfg. Co.

**Draft Rigging. (See Couplers.)**

**Drills, Track.**
American Steel & Wire Co.
Electric Service Supplies Co.
Long Co., E. G.
Niles-Bement-Pond Co.
Ohio Brass Co.

**Dryers, Sand.**
Electric Service Supplies Co.
Zelnicker Sup. Co., W. A.

**Engineers, Consulting, Contracting and Operating.**
Archbold-Brady Co.
Arnold Co., The
Beeler, John A.
Burch, Edw. P.
Byllesby & Co., Inc., H. M.
Ford, Bacon & Davis
Hunt & Co., Robert W.
Jackson, D. C. & Wm. B.
Little, Inc., Arthur D.
Richey, Albert S.
Sanderson & Porter
Scofield Engineering Co.
Stone & Webster Eng. Corp.
White Companies, J. G.
Woodmansee & Davidson, Inc.

**Engines, Gas and Oil.**
Westinghouse Elec. & M. Co.

**Engines, Steam.**
Westinghouse Elec. & M. Co.

**Fare Boxes.**
Brill Co., The J. G.
Cleveland Fare Box Co.
International Register Co., The
Johnson Fare Box Co.

**Fences, Woven Wire and Fence Posts.**
American Steel & Wire Co.
Page Woven Wire Fence Co.

**Fenders and Wheel Guards.**
Brill Co., The J. G.
Cleveland Fare Box Co.
Consolidated Car Fender Co.
Electric Service Supplies Co.
Horne Mfg. Co.
Root Spring Scraper Co.
Star Brass Works

**Fibre Insulation.**
National Ry. Appliance Co.

**Fibre and Fibre Tubing.**
Diamond State Fibre Co.
Johns-Manville Co., H. W.
Westinghouse Elec. & M. Co.

**Field Coils. (See Coils.)**

**Filters, Water.**
Scaife & Sons, Co., Wm. B.

**Fire Extinguishing Apparatus.**
Johns-Manville Co., H. W.

**Fire-Proofing Material.**
Johns-Manville Co., H. W.

**Flooring Composition.**
American Mason Safety Tread Co
Johns-Manville Co., H. W.

**Forgings.**
Eureka Co.
Standard Steel Works Co.

**Frogs, Track. (See Track Work.)**

**Furnaces. (See Stokers.)**

**Fuses and Fuse Boxes.**
Columbia M. W. & M. I. Co.
D & W Fuse Co.
Daum, A. F.
General Electric Co.
Johns-Manville Co., H. W.
Westinghouse Elec. & M. Co.

**Fuses, Refillable.**
Columbia M. W. & M. I. Co.
Economy Fuse & Mfg. Co.
General Electric Co.
Horne Mfg. Co.

**Gaskets.**
Diamond State Fibre Co.
Johns-Manville Co., H. W.
Power Specialty Co.

**Gas Producers.**
Westinghouse Elec. & M. Co.

**Gates, Car.**
Brill Co., The J. G.

**Gages, Oil and Water.**
Ohio Brass Co.

**Gear Blanks.**
Carnegie Steel Co.
Diamond State Fibre Co.
Standard Steel Works Co.

**Gear Cases.**
Columbia M. W. & M. I. Co.
Electric Service Supplies Co.
Kerschner Co., Inc., W. R.
National Ry. Appliance Co.
Thayer & Co., Inc.
Westinghouse Elec. & M. Co.

**Gears and Pinions.**
Columbia M. W. & M. I. Co.
Diamond State Fibre Co.
Electric Service Supplies Co.
General Electric Co.
Kerschner Co., Inc., W. R.
Long Co., E. G.
National Ry. Appliance Co.
Nuttall Co., R. D.
Tool Steel Gear & Pinion Co.

**Generating Sets, Gas-Electric.**
General Electric Co.

**Generators.**
General Electric Co.
Westinghouse Elec. & M. Co.

**Gongs. (See Bells and Gongs.)**

**Graphite.**
Dixon Crucible Co., Joseph
Morgan Crucible Co.

**Greases. (See Lubricants.)**

**Grinders and Grinding Supplies.**
General Electric Co.
Goldschmidt Thermit Co.
Railway Track-work Co.

**Guards, Cattle.**
American Bridge Co.

**Guards, Trolley.**
Electric Service Supplies Co.
Ohio Brass Co.

**Harps, Trolley.**
Anderson M. Co., A. & J. M.
Electric Service Supplies Co.
Hensley Trolley & Mfg. Co.
More-Jones B. & M. Co.
Nuttall Co., R. D.
Star Brass Works.

**Headlights.**
Electric Service Supplies Co.
General Electric Co.
Kerschner Co., Inc., W. R.
Long Co., E. G.
Ohio Brass Co.
St. Louis Car Co.
Westinghouse Elec. & M. Co.

**Headlining.**
Kerschner Co., Inc., W. R.
Pantasote Co., The.

**Heaters, Car (Electric).**
Gold Car Heating & Lighting Co.
Smith Heater Co., Peter.

**Heaters, Car, Hot Air and Water.**
Cooper Heater Co.
Smith Heater Co., Peter.

**Heaters, Car (Stove).**
Electric Service Supplies Co.
Smith Heater Co., Peter.

**Hoists and Lifts.**
Columbia M. W. & M. I. Co.
Duff Mfg. Co.
Ford Chain Block & Mfg. Co.
Niles-Bement-Pond Co.

**Hose, Bridges.**
Ohio Brass Co.

**Hose, Pneumatic & Fire.**
Johns-Manville Co., H. W.

**Hydraulic Machinery.**
Niles-Bement-Pond Co.

**Hydrogrounds.**
Horne Mfg. Co.

**Inspection.**
Electrical Testing Lab's.
Hunt & Co., Robt. W.

**Instruments, Measuring, Testing and Recording.**
General Electric Co.
Johns-Manville Co., H. W.
Sangamo Electric Co.
Westinghouse Elec. & M. Co.
Weston Elec'l Instrument Co.

**Insulating Cloth, Paper and Tape.**
Diamond State Fibre Co.
General Electric Co.
Johns-Manville Co., H. W.
Mechanical Rubber Co.
Packard Electric Co.
Standard Underground Cable Co.
Standard Woven Fabric Co.
Westinghouse Elec. & M. Co.

**Insulations. (See also Paints.)**
Anderson M. Co., A. & J. M.
Diamond State Fibre Co.
Electric Service Supplies Co.
General Electric Co.
Holden & White, Inc.
Johns-Manville Co., H. W.
Mechanical Rubber Co.
Westinghouse Elec. & M. Co.

**Insulators. (See also Line Material.)**
Anderson M. Co., A. & J. M.
Drew Elec. & Mfg. Co.
Electric Railway Equipment Co.
Electric Service Supplies Co.
General Electric Co.
Johns-Manville Co., H. W.
Ohio Brass Co.
Westinghouse Elec. & M. Co.

**Insulator Pins.**
Hubbard & Co.

**Insurance, Fire.**
Marsh & McLennan.

**Jacks. (See also Cranes, Hoists and Lifts.)**
Brill Co., The J. G.
Buckeye Jack Mfg. Co.
Columbia M. W. & M. I. Co.
Duff Manufacturing Co.
National Ry. Appliance Co.

**Joints, Rail.**
Atlantic Welding Co.
Carnegie Steel Co.
Rail Joint Co.
Zelnicker Sup. Co., W. A.

**Journal Boxes.**
Bemis Car Truck Co.
Brill Co., The J. G.
Long Co., E. G.
Railway Roller Bearing Co.

**Junction Boxes.**
Johns-Manville Co., H. W.
Standard Underground Cable Co.

**Laboratory.**
Electric Testing Lab's.
Little, Inc., Arthur D.

**Lamp Guards and Fixtures.**
Anderson M. Co., A. & J. M.
Electric Service Supplies Co.
General Electric Co.
Westinghouse Elec. & M. Co.

**Lamps, Arc and Incandescent. (See also Headlights.)**
Anderson M. Co., A. & J. M.
General Electric Co.
Westinghouse Elec. & M. Co.

**Lamps, Signal and Marker.**
Ohio Brass Co.

**Lathes, Car Wheel.**
Niles-Bement-Pond Co.

**Lighting Regulators, Car.**
Holden & White, Inc.

**Lightning Protection.**
Anderson M. Co., A. & J. M.
Electric Service Supplies Co.
General Electric Co.
Horne Mfg. Co.
Ohio Brass Co.
Westinghouse Elec. & M. Co.

**Line Material. (See also Brackets, Insulators, Wires, etc.)**
Anderson M. Co., A. & J. M.
Columbia M. W. & M. I. Co.
Diamond State Fibre Co.
Drew Electric & Mfg. Co.
Electric Railway Equipment Co.
Electric Service Supplies Co.
Eureka Co.
General Electric Co.
Holden & White, Inc.
Hubbard & Co.
Johns-Manville Co., H. W.
More-Jones B. & M. Co.
Ohio Brass Co
Westinghouse Elec. & M. Co.

**Lock Nuts.**
Roller Lock Nut Co.

**Locomotives, Electric.**
Baldwin Locomotive Works.
Brill Co., The J. G.
General Electric Co.
Westinghouse Elec. & M. Co.

**Lubricants, Oil and Grease.**
Dearborn Chemical Co.
Dixon Crucible Co., Jos.

**Lumber. (See Poles, Ties, etc.)**

**Machine Tools.**
Columbia M. W. & M. I. Co.
Niles-Bement-Pond Co.

**Machine Work.**
Columbia M. W. & M. I. Co.
Horne Mfg. Co.

**Mats.**
Johns-Manville Co., H. W.

**Meters. (See Instruments.)**

**Meters, Car, Watt-Hour.**
Sangamo Electric Co.

**Mica.**
Long Co., E. G.

**Mirrors for Motormen.**
Drew Electric & Mfg. Co.

**Motormen's Seats.**
Electric Service Supplies Co.
Wood Co., Chas. N.

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"IMPERIAL" TIE TAMPERS

are doing much to solve the labor problem of the maintenance department of many railways and traction companies.

They speed up the work, release men of other work and effect a more firmly ballasted and permanently stable track than hand work.

These pneumatic tampers are ordinarily operated from "Imperial" hand car mounted portable compressors which take their operating power from the trolley line. Gasoline driven units are also available.

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# WHAT AND WHERE TO BUY

**Motors, Electric.**
General Electric Co.
Westinghouse Elec. & M. Co.

**Motor Generation, Bonding and Welding.**
Lincoln Bonding Co.

**Nuts and Bolts.**
Bemis Car Truck Co.
Columbia M. W. & M. I. Co.
Hubbard & Co.
Long Co., E. G.
National Railway Appliance Co.
Roller Lock Nut Co.

**Oils. (See Lubricants.)**

**Oxy-Acetylene. (See Cutting Apparatus, Oxy-Acetylene.)**

**Packing.**
Diamond State Fibre Co.
Electric Service Supplies Co.
Horne Mfg. Co.
Johns-Manville Co., H. W.
Mechanical Rubber Co.
Post & Co., E. L.
Power Specialty Co.

**Packing Rings.**
Johns-Manville Co., H. W.

**Paints and Varnishes. (Insulating.)**
General Electric Co.
Johns-Manville Co., H. W.
Long Co., E. G.
Packard Electric Co.

**Paints and Varnishes. (Preservative.)**
Dixon Crucible Co., Jos.
Johns-Manville Co., H. W.
Long Co., E. G.
National Ry. Appliance Co.

**Paints and Varnishes for Woodwork.**
National Ry. Appliance Co.

**Paving Bricks, Filler and Stretcher.**
Nelsonville Brick Co.

**Paving Material.**
Am. Brake Shoe & Fdy. Co.
Nelsonville Brick Co.

**Pickups, Trolley Wire.**
Electric Service Supplies Co.
Ohio Brass Co.

**Pinion Pullers.**
Columbia M. W. & M. I. Co.
Electric Service Supplies Co.
General Electric Co.
Wood Co., Chas. N.

**Pinions. (See Gears.)**

**Pins, Case Hardened, Wood and Iron.**
Bemis Car Truck Co.
Electric Service Supplies Co.
Long Co., E. G.
Ohio Brass Co.

**Pipe.**
National Tube Co.

**Pipe Fittings.**
National Tube Co.
Power Specialty Co.
Standard Steel Works Co.

**Planers. (See Machine Tools.)**

**Pole Reinforcing.**
Hubbard & Co.

**Poles and Ties, Treated.**
Lindsley Bros. Co.
Page & Hill Co.
Valentine-Clark Co.

**Poles, Metal Street.**
Bates Expanded Steel Truss Co.
Electric Railway Equipment Co.
Hubbard & Co.
National Tube Co.

**Pole Sleeves.**
Drew Electric & Mfg. Co.

**Poles, Ties, Posts, Piling and Lumber.**
Carney & Co., B. J.
Lindsley Bros. Co.
Page & Hill Co.
Valentine-Clark Co.

**Poles, Trolley.**
Anderson M. Co., A. & J. M.
Columbia M. W. & M. I. Co.
Electric Service Supplies Co.
Long Co., E. G.
National Tube Co.
Nuttall Co., R. D.

**Power Saving Devices.**
Arthur Power-Saving Recorder Co.
Railway Improvement Co.

**Pressure Regulators.**
General Electric Co.
Ohio Brass Co.

**Punches, Ticket.**
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**Second-Hand Equipment. (See also pages 56-59.)**
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Hartshorn Co., Stewart.

**Shades, Vestibule.**
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Simmen Automatic Railway Signal Co.
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Universal Safety Tread Co.

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Green Engrg. Co.
Murphy Iron Works.
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**Superheaters.**
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Kilby Frog & Switch Co.
Ramapo Iron Works.

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Cutter Electrical & Mfg. Co.
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Electric Service Supplies Co.
General Electric Co.
Westinghouse Elec. & M. Co.

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Smith Heater Co., Peter.

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Columbia M. W. & M. I. Co.
Electric Service Supplies Co.
Hubbard & Co.
Johns-Manville Co., H. W.
Klein & Sons, Mathias.
Railway Track-work Co.

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Archbold-Brady Co.
Bates Exp. Steel Truss Co.
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Cleveland Frog & Cross. Co.
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Kilby Frog & Switch Co.
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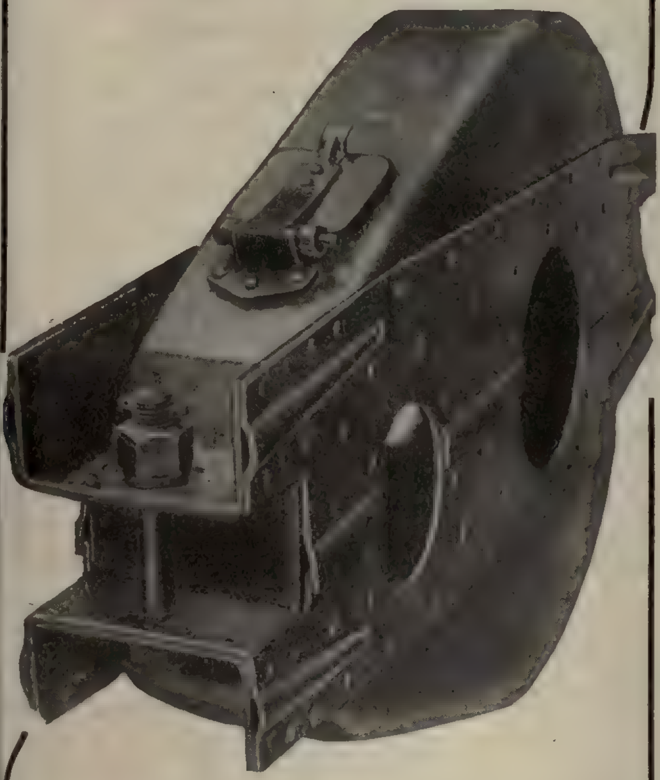

**Seamless**

This feature protects your gears and pinions from water, mud, etc., and prevents oil leakage.

**Rivet-less**

This feature defies vibration, which is a great menace to rivets.

**Lightweight**

40% less than malleable iron cases and equally durable, if not more so, especially on bad roadbeds, where a bump will smash the former and only dent the Chillingworth.

**Thayer & Co., Inc.**
**Selling Agents in U. S. and Canada**
**111 Broadway New York**

---

# Harnth

In some sections of Central Africa the penalty for stealing is harnth punishment—cutting off the hands of the offender. They feel that if a man has no hands he cannot steal—forgetting that it isn't the hands that steal, but the heart.

"Terrible lack of judgment," exclaims the operator as he puts another gob of lubricant on the commutator to silence the din, forgetting that a prescription of Morganite brushes for his machines would relieve him permanently of any lubricating worry.

If you are compelled to tinker with commutator or brushes—don't do any such surface thinking—get to the heart of things—the brushes—get Morganite.

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150 Steuart Street, San Francisco, Cal.
W. R. Hendrey Co., Hoge Bldg., Seattle, Wash.
Charles Farnham, I. W. Hellman Bldg., Los Angeles, Cal.

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General Electric Co.
Holden & White, Inc.
Horne Mfg. Co.
More-Jones B. & M. Co.
Nuttall Co., R. D.
Ohio Brass Co.

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Holden & White, Inc.

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Ford Chain Block & Mfg. Co.

**Trolley Shoes.**
Holden & White, Inc.

**Trolley Wheels. (See Wheels, Trolley.)**

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American Steel Foundries.
Baldwin Locomotive Works.
Bemis Car Truck Co.
Brill Co., The J. G.
Long Co., E. G.
St. Louis Car Co.

**Tubing, Steel.**
National Tube Co.

**Turbines, Steam.**
General Electric Co.
Westinghouse Elec. & M. Co

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National Tube Co.

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National Tube Co.
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**Washers.**
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Diamond State Fibre Co.

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**Welding Processes and Apparatus.**
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Electric Railway Improvement Co.
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National Ry. Appliance Co.
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**Wheel Presses. (See Machine Tools.)**

**Wheels, Car, Cast Iron.**
Bemis Car Truck Co.
Griffin Wheel Co.
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Bemis Car Truck Co.
Carnegie Steel Co.
Standard Steel Works Co

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Bound Brook Oil-less B. Co.
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Electric Service Supplies Co.
Eureka Co.
General Electric Co.
Hensley Trolley & Mfg. Co.
Holden & White, Inc
Johns-Manville Co., H. W.
Long Co., E. G.
More-Jones B. & M. Co.
Nuttall Co., R. D.
Star Brass Works.

**Whistles, Air.**
General Electric Co.
Ohio Brass Co.

**Wire Rope.**
American Steel & Wire Co.
Roebling's Sons Co., John A.

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American Steel & Wire Co.
Bridgeport Brass Co.
D & W Fuse Co.
General Electric Co.
Packard Electric Co.
Page Woven Wire Fence Co.
Roebling's Sons Co., John A
Standard Underground Cable Co.
Westinghouse Elec. & M Co.

**Wood Preservatives.**
Lindsley Bros. Co.
Valentine-Clark Co.

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The grinding, uneven wear at curves soon finds out the many weak spots in the ordinary rail.

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*Inspecting*

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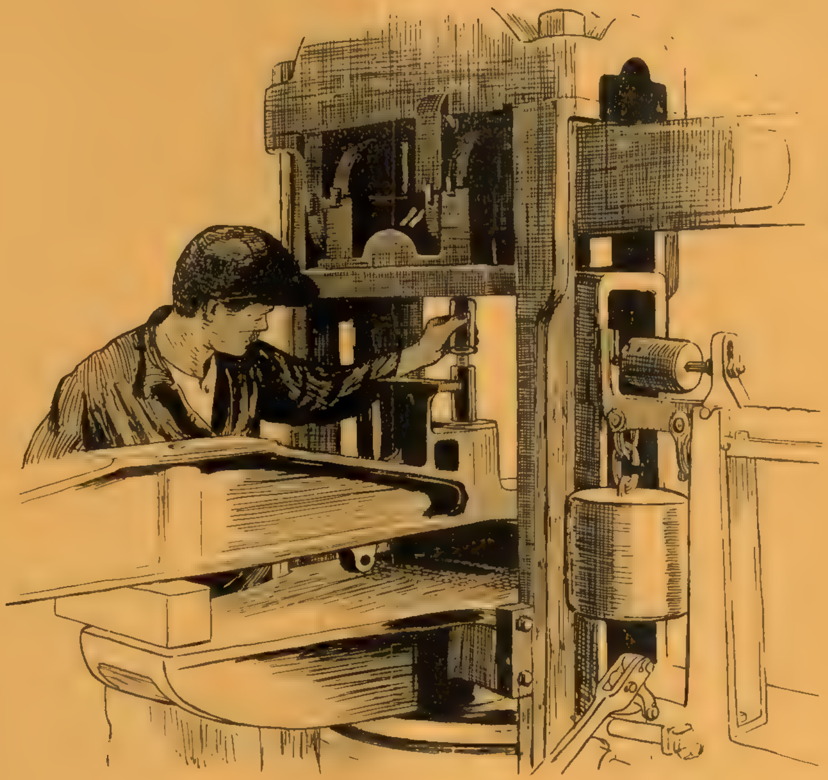
**The Railway Roller Bearing Co.**

**Syracuse, New York**



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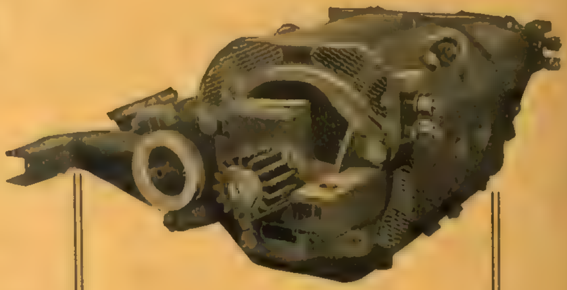

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6782

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